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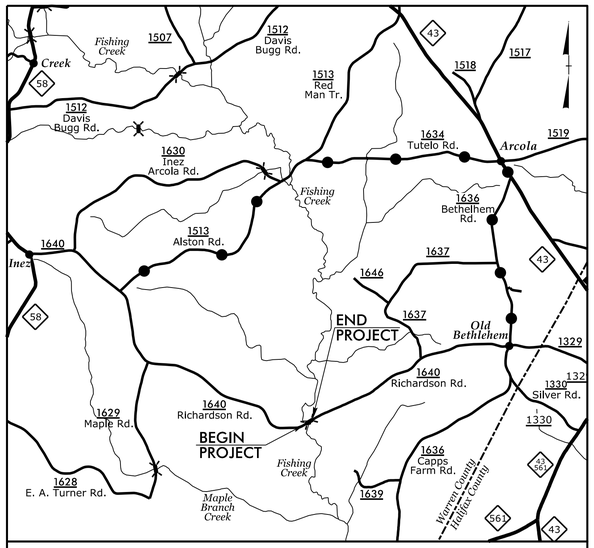
09/08/99

TIP PROJECT:17BP.5.R.77

CONTRACT: DE00269



See Sheet 1A For Index of Sheets
See Sheet 1B For Conventional Symbols

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

WARREN COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.5.R.77	1	

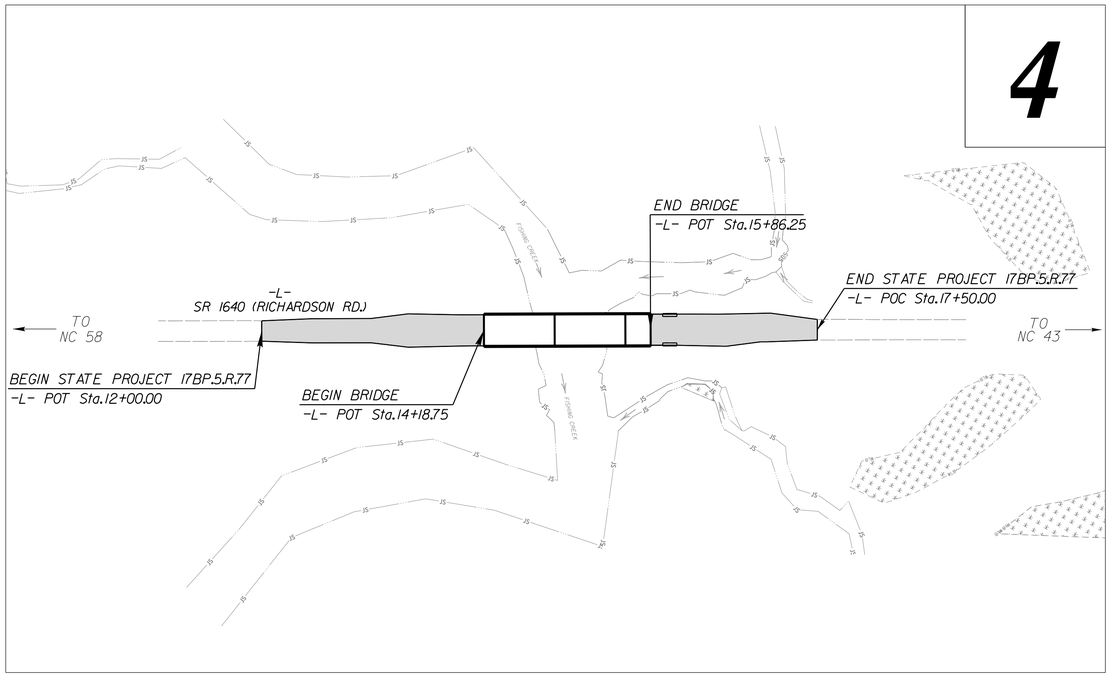
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
17BP.5.R.77	N/A	PE
17BP.5.R.77	N/A	ROW /UTILITIES
17BP.5.R.77	N/A	CONSTRUCTION

LOCATION: BRIDGE NO. 77 OVER FISHING CREEK ON SR 1640 (RICHARDSON RD.)

TYPE OF WORK: GRADING, DRAINAGE, PAVING, AND STRUCTURE

NAD 83/NA 2011

4



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES

PLANS: 50 25 0 50 100

PROFILE (HORIZONTAL): 50 25 0 50 100

PROFILE (VERTICAL): 10 5 0 10 20

DESIGN DATA

ADT = 1,000 VPD
V = 60 MPH
CLASS = RURAL
LOCAL

SUBREGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY STATE PROJECT 17BP.5.R.77	=	0.072 mi.
LENGTH STRUCTURES STATE PROJECT 17BP.5.R.77	=	0.032 mi.
TOTAL LENGTH STATE PROJECT 17BP.5.R.77	=	0.104 mi.

Prepared in the Offices of:

STEWART
223 S. WEST ST, STE 1100
RALEIGH, NC 27603
T 919.380.8750
Firm License #: C-1051
www.stewartinc.com

NC FIRM LICENSE No: F-1148
1531 SE Cary Parkway, Suite 101
Cary, NC 27518
(919) 557-0929
ECOLOGICAL ENGINEERING

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: DECEMBER 23, 2017

RIGHT OF WAY COMPLETE: JUNE 23, 2018

LETTING DATE: SEPTEMBER 12, 2018

ANDY YOUNG, PE
PROJECT ENGINEER

MICHAEL BURNS, PE
PROJECT DESIGN ENGINEER

LISA GILCHRIST, EI
NCDOT CONTACT

HYDRAULICS ENGINEER

7/31/2018

DocuSigned by: Reid B. Robol 7074FDA3F200470...

P.E.

SIGNATURE:

NORTH CAROLINA PROFESSIONAL SEAL 043870 ENGINEER REID B. ROBOL

ROADWAY DESIGN ENGINEER

7/26/2018

DocuSigned by: Michael S. Burns, Jr. D425C8CC006F437...

P.E.

SIGNATURE:

NORTH CAROLINA PROFESSIONAL SEAL 045230 ENGINEER MICHAEL S. BURNS JR.

STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION ·

7/24/2018
...\Proj\920077_RDY_TSH.dgn
USER:jroemer

PROJECT REFERENCE NO.	SHEET NO.
I7BP.5.R.77	IA

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 045230 ENGINEER MICHAEL S. BURNS, JR.

DocuSigned by: Michael S. Burns, Jr. 7/26/2018

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REVISIONS

INDEX OF SHEETS

EFF. 01-16-2018
REV.

2018 ROADWAY ENGLISH STANDARD DRAWINGS

The following Roadway Standards as appear in "Roadway Standard Drawings" Highway Design Branch - N. C. Department of Transportation - Raleigh, N. C., Dated January, 2018 are applicable to this project and by reference hereby are considered a part of these plans:

STD.NO.	TITLE
DIVISION 2 - EARTHWORK	
200.02	Method of Clearing - Method II
225.02	Guide for Grading Subgrade - Secondary and Local
225.04	Method of Obtaining Superelevation - Two Lane Pavement
275.01	Rock Plating
DIVISION 3 - PIPE CULVERTS	
300.01	Method of Pipe Installation
DIVISION 4 - MAJOR STRUCTURES	
422.02	Bridge Approach Fills - Type II Modified Approach Fill
DIVISION 5 - SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction - High Side of Superelevated Curve - Method I
DIVISION 8 - INCIDENTALS	
806.01	Concrete Right-of-Way Marker
806.02	Granite Right-of-Way Marker
840.00	Concrete Base Pad for Drainage Structures
840.25	Anchorage for Frames - Brick or Concrete or Precast
840.29	Frames and Narrow Slot Flat Grates
840.35	Traffic Bearing Grated Drop Inlet - for Cast Iron Double Frame and Grates
840.46	Traffic Bearing Precast Drainage Structure
840.66	Drainage Structure Steps
846.01	Concrete Curb, Gutter and Curb & Gutter
846.04	Drop Inlet Installation in Shoulder Berm Gutter
862.01	Guardrail Placement
862.02	Guardrail Installation (Special Detail for Sheet 6 of 8)
862.03	Structure Anchor Units (Special Detail for Type III Anchor Units Sheets 1 of 7 and 2 of 7)
876.02	Guide for Rip Rap at Pipe Outlets

GENERAL NOTES:

2018 SPECIFICATIONS
EFFECTIVE: 01-16-2018
REVISED:

GRADE LINE:
GRADING AND SURFACING:

THE GRADE LINES SHOWN DENOTE THE FINISHED ELEVATION OF THE PROPOSED SURFACING AT GRADE POINTS SHOWN ON THE TYPICAL SECTIONS. GRADE LINES MAY BE ADJUSTED AT THEIR BEGINNING AND ENDING AND AT STRUCTURES AS DIRECTED BY THE ENGINEER IN ORDER TO SECURE A PROPER TIE-IN.

CLEARING:

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III.

SUPERELEVATION:

ALL CURVES ON THIS PROJECT SHALL BE SUPERELEVATED IN ACCORDANCE WITH STD. NO. 225.04 USING THE RATE OF SUPERELEVATION AND RUNOFF SHOWN ON THE PLANS. SUPERELEVATION IS TO BE REVOLVED ABOUT THE GRADE POINTS SHOWN ON THE TYPICAL SECTIONS.

SHOULDER CONSTRUCTION:

ASPHALT, EARTH, AND CONCRETE SHOULDER CONSTRUCTION ON THE HIGH SIDE OF SUPERELEVATED CURVES SHALL BE IN ACCORDANCE WITH STD. NO. 560.01

GUARDRAIL:

THE GUARDRAIL LOCATIONS SHOWN ON THE PLANS MAY BE ADJUSTED DURING CONSTRUCTION AS DIRECTED BY THE ENGINEER. THE CONTRACTOR SHOULD CONSULT WITH THE ENGINEER PRIOR TO ORDERING GUARDRAIL MATERIAL.

TEMPORARY SHORING:

SHORING REQUIRED FOR THE MAINTENANCE OF TRAFFIC WILL BE PAID FOR AS "EXTRA WORK" IN ACCORDANCE WITH SECTION 104-7.

END BENTS:

THE SURVEYOR SHALL CHECK THE STRUCTURE END BENT PLANS, DETAILS, AND CROSS-SECTION PRIOR TO SETTING OF THE SLOPE STAKES FOR THE EMBANKMENT OR EXCAVATION APPROACHING A BRIDGE.

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE

CenturyLink - Telecommunications

Halifax Electric - Power

Warren County Public Utilities - Water

ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS.

RIGHT-OF-WAY MARKERS:

ALL RIGHT-OF-WAY MARKERS ON THIS PROJECT SHALL BE PLACED BY CONTRACT.

12/2/2016

PROJECT REFERENCE NO.	SHEET NO.
17BP.5.R.77	1B

STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

Note: Not to Scale **S.U.E. = Subsurface Utility Engineering*

BOUNDARIES AND PROPERTY:

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Existing Iron Pin — EIP
- Computed Property Corner
- Property Monument — ECM
- Parcel/Sequence Number — 123
- Existing Fence Line
- Proposed Woven Wire Fence
- Proposed Chain Link Fence
- Proposed Barbed Wire Fence
- Existing Wetland Boundary — WLB
- Proposed Wetland Boundary — WLB
- Existing Endangered Animal Boundary — EAB
- Existing Endangered Plant Boundary — EPB
- Existing Historic Property Boundary — HPB
- Known Contamination Area: Soil — S
- Potential Contamination Area: Soil — S
- Known Contamination Area: Water — W
- Potential Contamination Area: Water — W
- Contaminated Site: Known or Potential

BUILDINGS AND OTHER CULTURE:

- Gas Pump Vent or U/G Tank Cap
- Sign — S
- Well — W
- Small Mine
- Foundation
- Area Outline
- Cemetery
- Building
- School
- Church
- Dam

HYDROLOGY:

- Stream or Body of Water
- Hydro, Pool or Reservoir
- Jurisdictional Stream — JS
- Buffer Zone 1 — BZ 1
- Buffer Zone 2 — BZ 2
- Flow Arrow
- Disappearing Stream
- Spring
- Wetland
- Proposed Lateral, Tail, Head Ditch — FLOW
- False Sump

RAILROADS:

- Standard Gauge — CSX TRANSPORTATION
- RR Signal Milepost — MILEPOST 35
- Switch — SWITCH
- RR Abandoned
- RR Dismantled

RIGHT OF WAY & PROJECT CONTROL:

- Secondary Horiz and Vert Control Point
- Primary Horiz Control Point
- Primary Horiz and Vert Control Point
- Exist Permanent Easement Pin and Cap
- New Permanent Easement Pin and Cap
- Vertical Benchmark
- Existing Right of Way Marker
- Existing Right of Way Line
- New Right of Way Line — RW
- New Right of Way Line with Pin and Cap — RW
- New Right of Way Line with Concrete or Granite R/W Marker — RW
- New Control of Access Line with Concrete C/A Marker — CA
- Existing Control of Access — CA
- New Control of Access — CA
- Existing Easement Line — E
- New Temporary Construction Easement — E
- New Temporary Drainage Easement — TDE
- New Permanent Drainage Easement — PDE
- New Permanent Drainage / Utility Easement — DUE
- New Permanent Utility Easement — PUE
- New Temporary Utility Easement — TUE
- New Aerial Utility Easement — AUE

ROADS AND RELATED FEATURES:

- Existing Edge of Pavement
- Existing Curb
- Proposed Slope Stakes Cut — C
- Proposed Slope Stakes Fill — F
- Proposed Curb Ramp — CR
- Existing Metal Guardrail
- Proposed Guardrail
- Existing Cable Guiderail
- Proposed Cable Guiderail
- Equality Symbol
- Pavement Removal

VEGETATION:

- Single Tree
- Single Shrub
- Hedge
- Woods Line
- Orchard
- Vineyard — Vineyard

EXISTING STRUCTURES:

MAJOR:

- Bridge, Tunnel or Box Culvert — CONC
- Bridge Wing Wall, Head Wall and End Wall — CONC WW

MINOR:

- Head and End Wall — CONC HW
- Pipe Culvert
- Footbridge
- Drainage Box: Catch Basin, DI or JB — CB
- Paved Ditch Gutter
- Storm Sewer Manhole — S
- Storm Sewer — S

UTILITIES:

POWER:

- Existing Power Pole
- Proposed Power Pole
- Existing Joint Use Pole
- Proposed Joint Use Pole
- Power Manhole — P
- Power Line Tower
- Power Transformer
- U/G Power Cable Hand Hole
- H-Frame Pole
- U/G Power Line LOS B (S.U.E.*) — P
- U/G Power Line LOS C (S.U.E.*) — P
- U/G Power Line LOS D (S.U.E.*) — P

TELEPHONE:

- Existing Telephone Pole
- Proposed Telephone Pole
- Telephone Manhole — T
- Telephone Pedestal — T
- Telephone Cell Tower
- U/G Telephone Cable Hand Hole — HH
- U/G Telephone Cable LOS B (S.U.E.*) — T
- U/G Telephone Cable LOS C (S.U.E.*) — T
- U/G Telephone Cable LOS D (S.U.E.*) — T
- U/G Telephone Conduit LOS B (S.U.E.*) — TC
- U/G Telephone Conduit LOS C (S.U.E.*) — TC
- U/G Telephone Conduit LOS D (S.U.E.*) — TC
- U/G Fiber Optics Cable LOS B (S.U.E.*) — T FO
- U/G Fiber Optics Cable LOS C (S.U.E.*) — T FO
- U/G Fiber Optics Cable LOS D (S.U.E.*) — T FO

WATER:

- Water Manhole — W
- Water Meter
- Water Valve
- Water Hydrant
- U/G Water Line LOS B (S.U.E*) — W
- U/G Water Line LOS C (S.U.E*) — W
- U/G Water Line LOS D (S.U.E*) — W
- Above Ground Water Line — A/G Water

TV:

- TV Pedestal — C
- TV Tower
- U/G TV Cable Hand Hole — HH
- U/G TV Cable LOS B (S.U.E.*) — TV
- U/G TV Cable LOS C (S.U.E.*) — TV
- U/G TV Cable LOS D (S.U.E.*) — TV
- U/G Fiber Optic Cable LOS B (S.U.E.*) — TV FO
- U/G Fiber Optic Cable LOS C (S.U.E.*) — TV FO
- U/G Fiber Optic Cable LOS D (S.U.E.*) — TV FO

GAS:

- Gas Valve
- Gas Meter
- U/G Gas Line LOS B (S.U.E.*) — G
- U/G Gas Line LOS C (S.U.E.*) — G
- U/G Gas Line LOS D (S.U.E.*) — G
- Above Ground Gas Line — A/G Gas

SANITARY SEWER:

- Sanitary Sewer Manhole
- Sanitary Sewer Cleanout
- U/G Sanitary Sewer Line — SS
- Above Ground Sanitary Sewer — A/G Sanitary Sewer
- SS Forced Main Line LOS B (S.U.E.*) — FSS
- SS Forced Main Line LOS C (S.U.E.*) — FSS
- SS Forced Main Line LOS D (S.U.E.*) — FSS

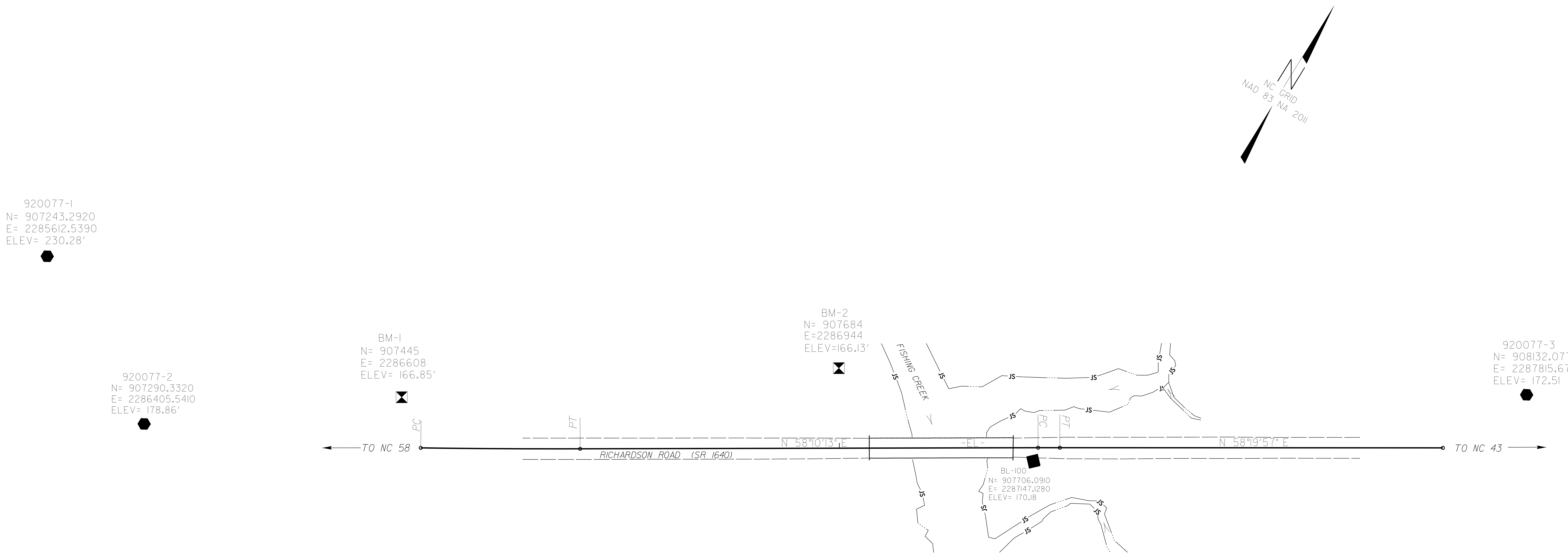
MISCELLANEOUS:

- Utility Pole
- Utility Pole with Base
- Utility Located Object
- Utility Traffic Signal Box — S
- Utility Unknown U/G Line LOS B (S.U.E.*) — ?UTL
- U/G Tank; Water, Gas, Oil
- Underground Storage Tank, Approx. Loc. — UST
- A/G Tank; Water, Gas, Oil
- Geoenvironmental Boring
- U/G Test Hole LOS A (S.U.E.*)
- Abandoned According to Utility Records — AATUR
- End of Information — E.O.I.

PROJECT REFERENCE NO.	SHEET NO.
92–0077	1C–1
Location and Surveys	

SURVEY CONTROL SHEET 92–0077

W/ EXISTING CENTERLINE ALIGNMENTS PRIOR TO CONSTRUCTION



DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "920077-1"
WITH NAD 83/NA 2011 STATE PLANE GRID COORDINATES OF
NORTHING: 907243.292(ft) EASTING: 2285612.539(ft)
ELEVATION: 230.28(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 1.00001726
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "920077-1" TO -L- STATION IS

ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

NOTE: DRAWING NOT TO SCALE

NOTES:

1. IF FURTHER INFORMATION REGARDING PROJECT CONTROL IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

2. PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.

1/23/18

7/24/2018
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USER:jroemer

PROJECT REFERENCE NO.	SHEET NO.
92–0077	1C–2
Location and Surveys	

SURVEY CONTROL SHEET 92–0077

W/ EXISTING CENTERLINE ALIGNMENTS PRIOR TO CONSTRUCTION

BASELINE

BL

POINT	DESC.	NORTH	EAST	ELEVATION
1	920077-1	907243.2920	2285612.5390	230.28′
2	920077-2	907290.3320	2286405.5410	178.86′
100	BL-100	907706.0910	2287147.1280	170.18′
3	920077-3	908132.0770	2287815.6710	172.51′

****

BM1 ELEVATION = 166.85′
N 907445 E 2286608

RR SPIKE IN 24" GUM

****

****

BM2 ELEVATION = 166.13′
N 907684 E 2286944

RR SPIKE IN 36" OAK

****

NOTES:

1. IF FURTHER INFORMATION REGARDING PROJECT CONTROL IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

2. PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.

NOTE: DRAWING NOT TO SCALE

PROJECT REFERENCE NO.	SHEET NO.
92-0077	1C-3
Location and Surveys	

SURVEY CONTROL SHEET 92-0077

W/ EXISTING CENTERLINE ALIGNMENTS PRIOR TO CONSTRUCTION

EL

POINT	N	E	BEARING	DIST	DELTA	D	L	T	R
PC	907409.664	2286642.374							
CURVE			N 58°39'37.2" E	152.39	00°58'48.0"(LT)	00°38'35.2"	152.39	76.20	8909.33
PT	907488.922	2286772.528							
LINE			N 58°10'13.2" E	437.49					
PC	907719.655	2287144.232							
CURVE			N 58°16'26.6" E	20.75	00°12'26.9"(RT)	01°00'00.0"	20.75	10.37	5729.58
PT	907730.565	2287161.880							
LINE			N 58°19'57.3" E	365.97					
POT	907922.694	2287473.359							

NOTES:

1. IF FURTHER INFORMATION REGARDING PROJECT CONTROL IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

2. PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.

NOTE: DRAWING NOT TO SCALE

PROPOSED ALIGNMENT CONTROL SHEET 92–0077

L

TYPE	STATION	NORTH	EAST
PC	10+00.00	907409.6640	2286642.3745
PT	11+52.39	907488.9223	2286772.5284
PC	15+89.88	907719.6550	2287144.2322
PRC	16+10.63	907730.5653	2287161.8797
PT	19+76.60	907922.6945	2287473.3595

NOTES:

1. IF FURTHER INFORMATION REGARDING PROJECT CONTROL IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

2. PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.

NOTE: DRAWING NOT TO SCALE

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 045230 MICHAEL S. BURNS, JR. — DocuSigned by: Michael S. Burns, Jr. 7/23/2018 — D425C8CC006F437...

PAVEMENT DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 22896 CLARK S. MORRISON — DocuSigned by: Clark Morrison 7/24/2018 — B0A110DD1E004C4...

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5/14/99

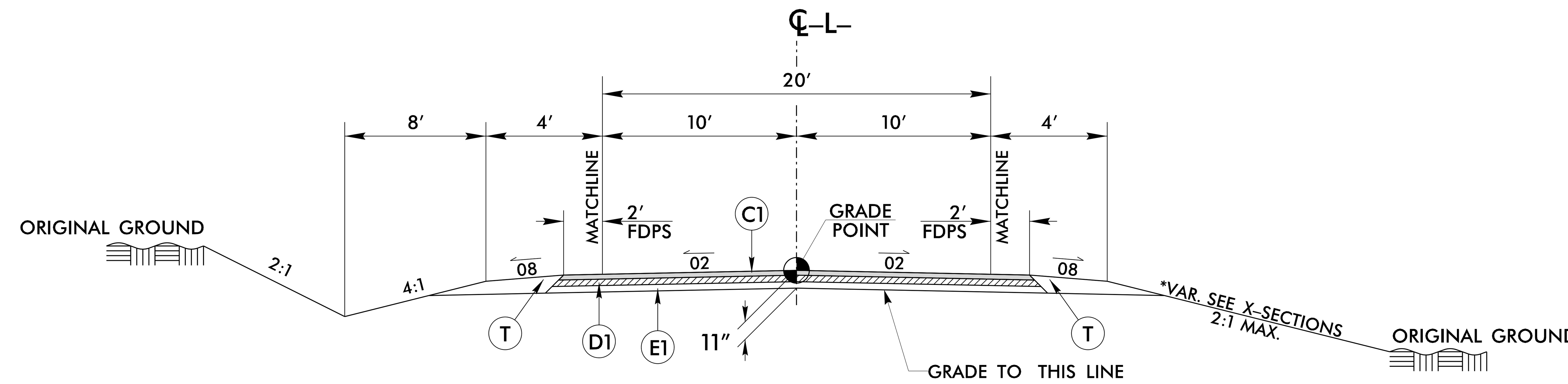
REVISIONS

PAVEMENT SCHEDULE

(FINAL PAVEMENT DESIGN)

C1	PROP. APPROX. 3″ ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C2	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 110 LBS. PER SQ. YD. PER 1″ DEPTH. TO BE PLACED IN LAYERS NOT TO EXCEED 2″ IN DEPTH.
D1	PROP. APPROX. 4″ ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
D2	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1″ DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2½″ IN DEPTH OR GREATER THAN 4″ IN DEPTH.
E1	PROP. APPROX. 4″ ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
R1	SHOULDER BERM GUTTER.
T	EARTH MATERIAL.
W	WEDGING (SEE THIS SHEET FOR WEDGING DETAIL).

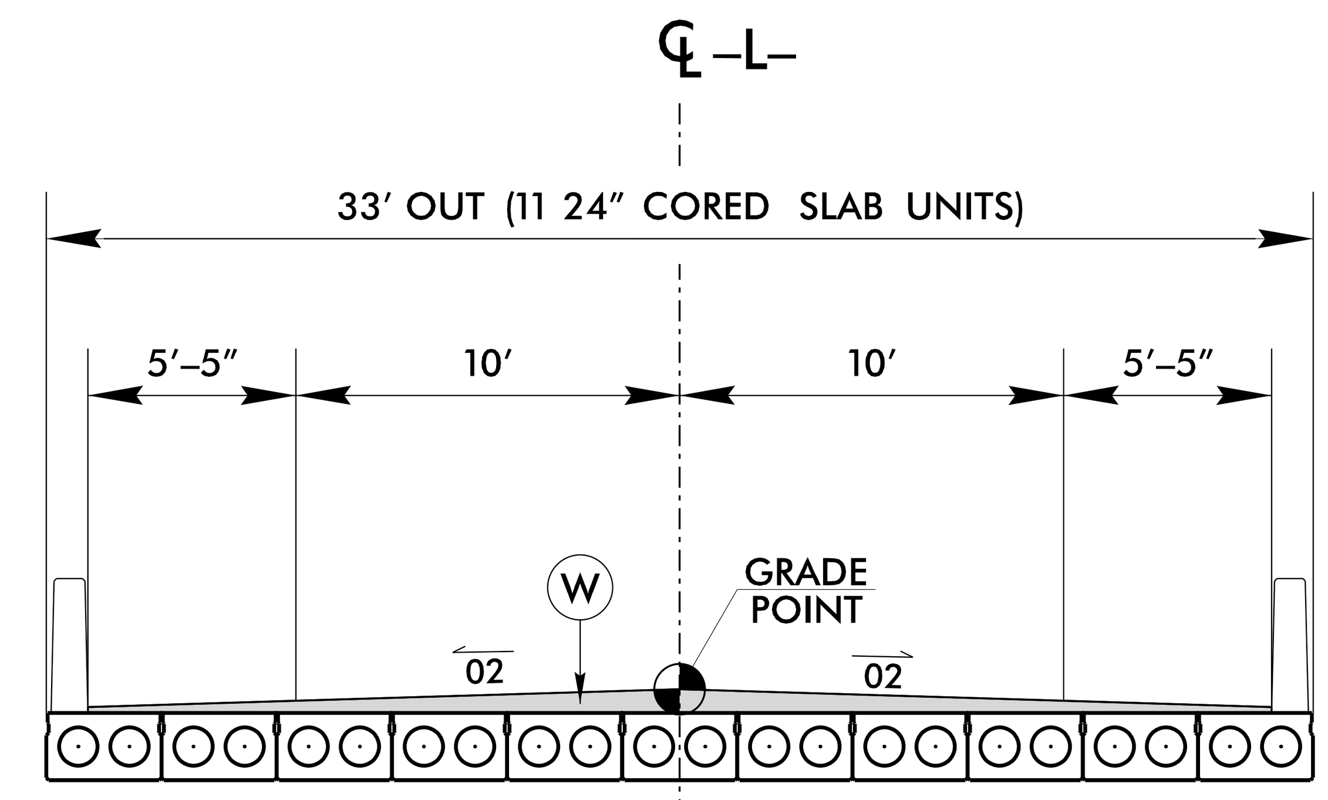
NOTE: PAVEMENT EDGE SLOPES ARE 1:1, UNLESS SHOWN OTHERWISE



TYPICAL SECTION NO. 1

–L– STA. 12+00.00 TO –L– STA. 14+18.75 (BEGIN BRIDGE)
–L– STA. 15+86.25 (END BRIDGE) TO –L– STA. 17+50.00

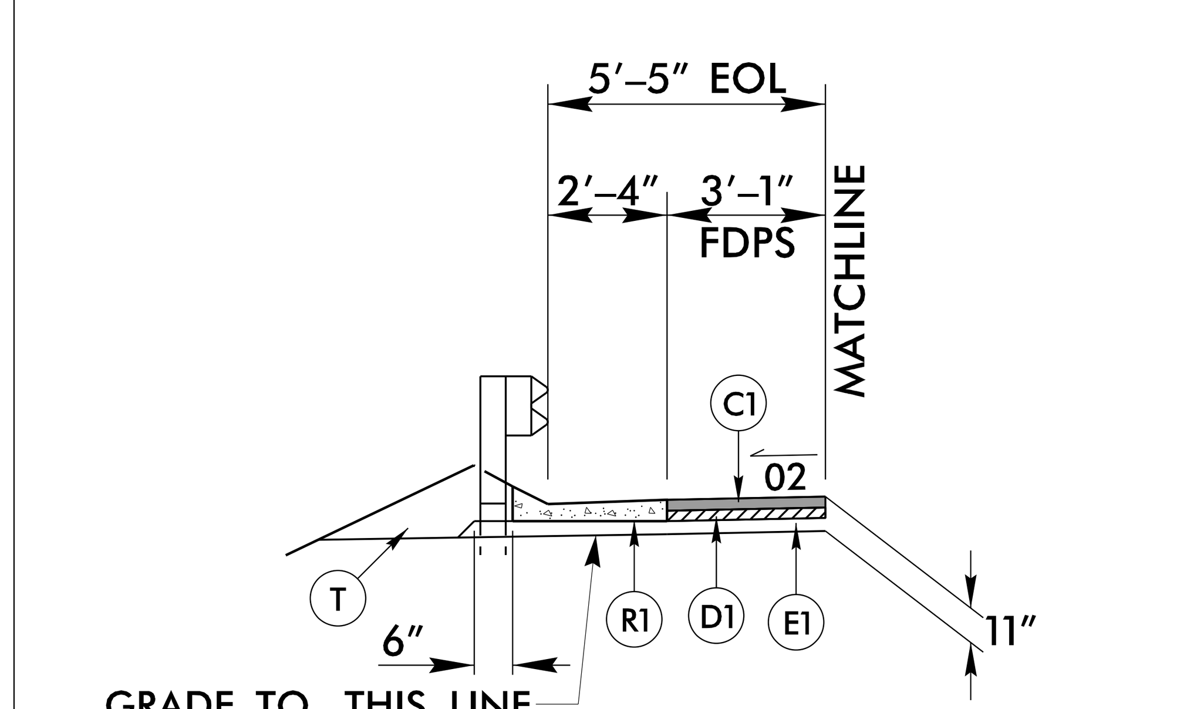
* 1.5:1 SLOPES FROM –L– STA. 15+85+/– TO 16+83+/– LT.



TYPICAL SECTION NO. 2

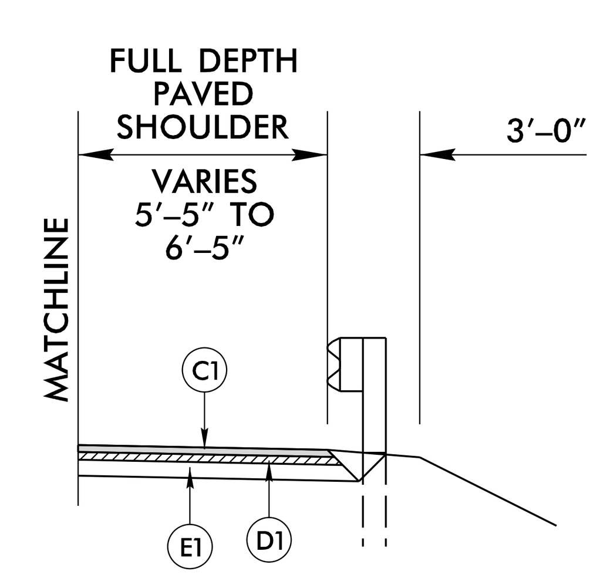
–L– STA. 14+18.75 (BEGIN BRIDGE) TO –L– STA. 15+86.25 (END BRIDGE)

NOTE:
FOR ASPHALT DEPTHS, SEE STRUCTURE PLANS

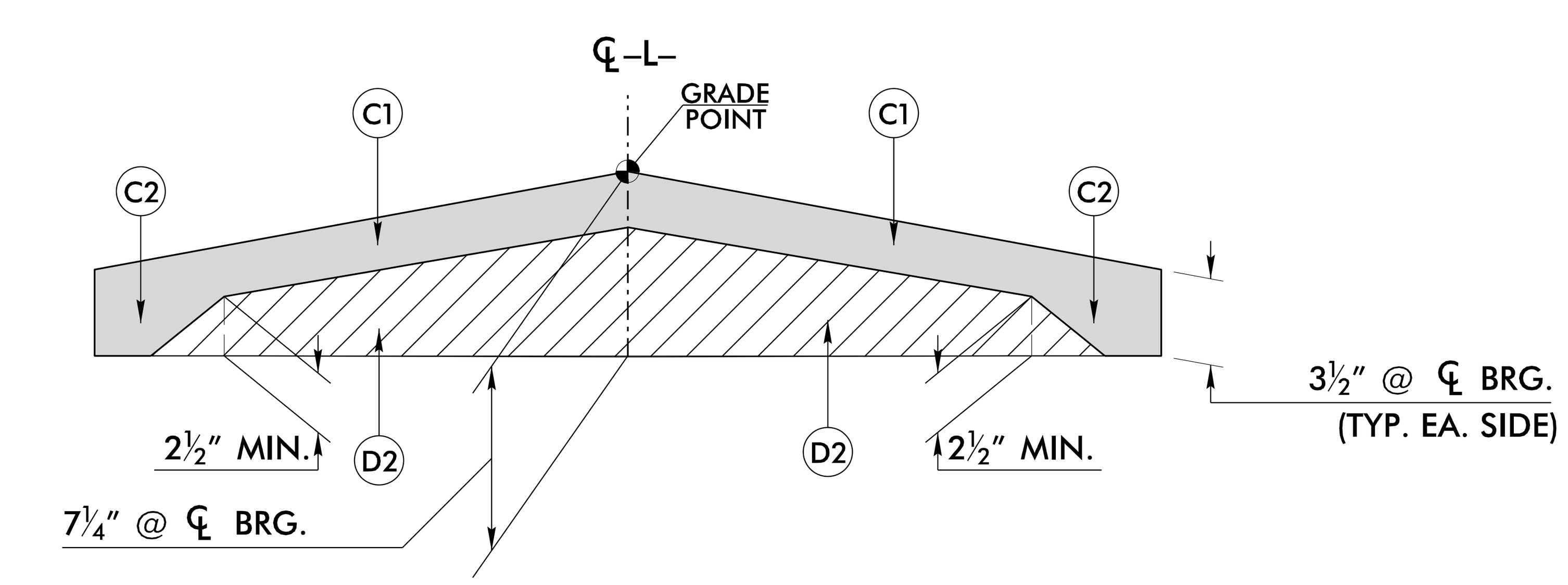


DETAIL SHOWING GUARDRAIL WITH SHOULDER BERM GUTTER

USE SHOULDER BERM GUTTER AT THE FOLLOWING LOCATIONS:
–L– STA. 15+97.13 (END APPROACH SLAB) TO –L– STA. 16+11.00 (LEFT)
–L– STA. 15+97.13 (END APPROACH SLAB) TO –L– STA. 16+11.00 (RIGHT)



DETAIL SHOWING PAVING TO THE FACE OF GUARDRAIL ON –L–



DETAIL SHOWING METHOD OF WEDGING ON BRIDGE

USE IN CONJUNCTION WITH BRIDGE TYPICAL SECTION

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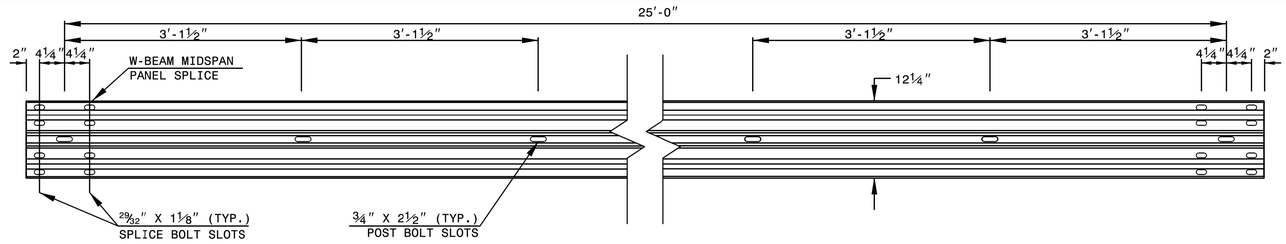
PROJECT REFERENCE NO.	SHEET NO.
17BP.5.R.77	2C-1
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

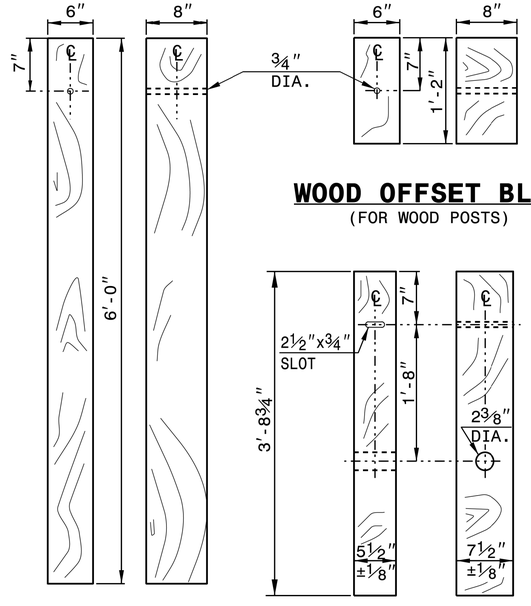
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET 6 OF 8
862D02



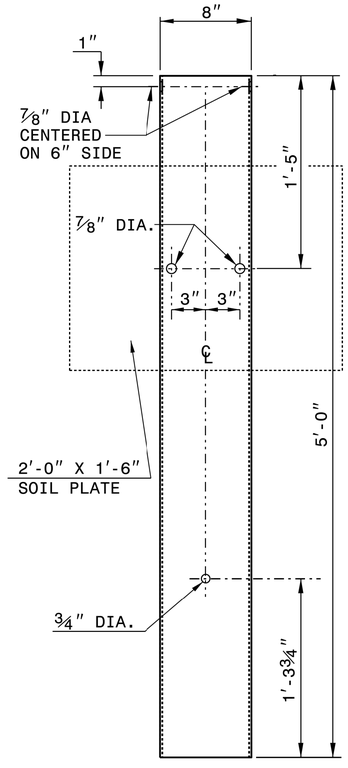
STANDARD W-BEAM GUARDRAIL



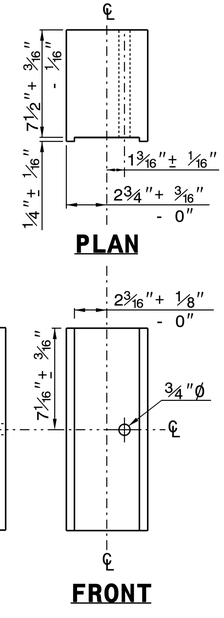
WOOD OFFSET BLOCK
(FOR WOOD POSTS)

STANDARD LINE POST

SHORT WOOD BREAKAWAY POST



STEEL TUBE
TS 6"x8"x0.1875"

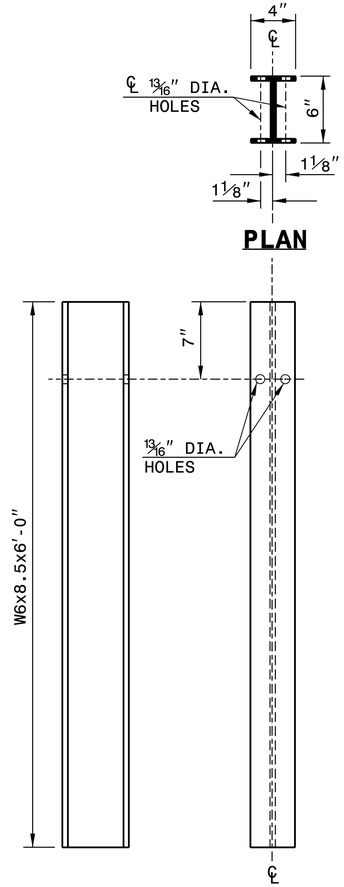


PLAN

SIDE

FRONT

ROUTED OFFSET BLOCK



PLAN

SIDE

FRONT

"W6" STEEL POST

SYSTEM PARTS

STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET 6 OF 8
862D02

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER JOEL S. HOWERTON
7/26/2018
DocuSigned by: Joel S. Howerton 873F3D17DCDC45F...

CONTRACTS STANDARDS AND DEVELOPMENT UNIT
Office 919-707-6950 FAX 919-250-4119

SEE TITLE BLOCK

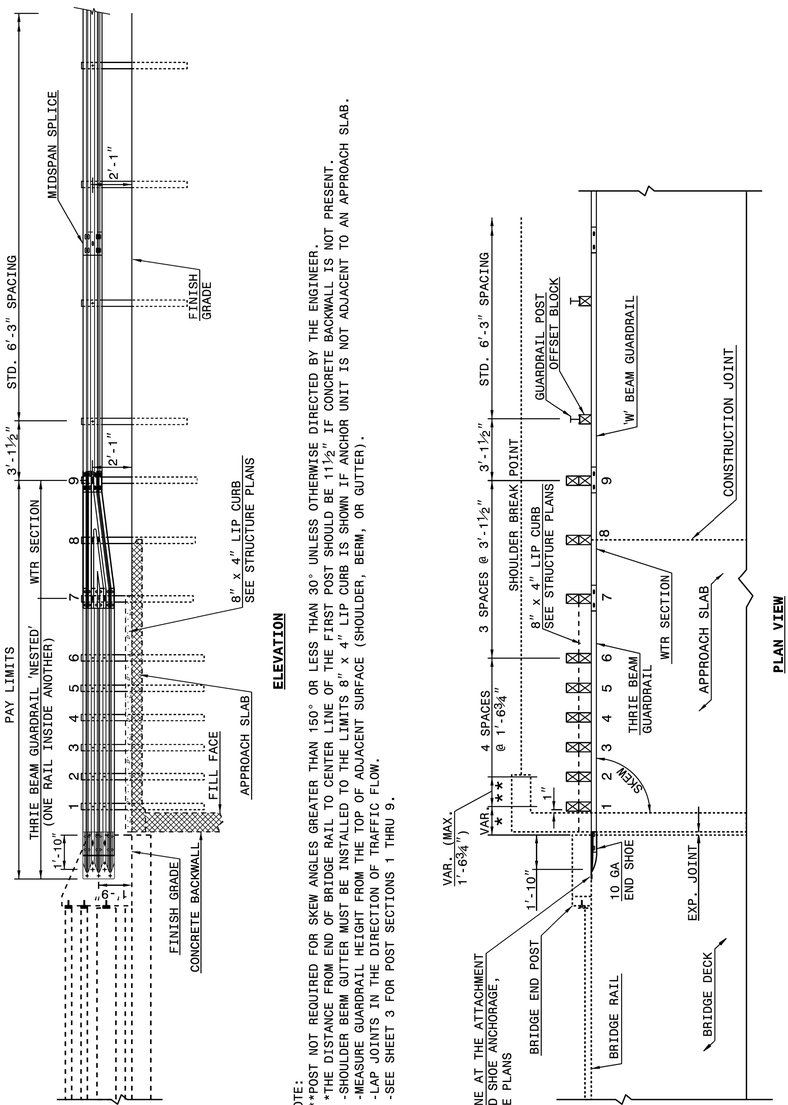
ORIGINAL BY: J.HOWERTON DATE: 3-7-2018
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC.:

PROJECT REFERENCE NO.	SHEET NO.
17BP.5.R.77	2C-2

STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR
STRUCTURE ANCHOR UNITS
GUARDRAIL ANCHOR UNIT, TYPE III
FOR ATTACHMENT TO RAIL ON BRIDGE

SHEET 1 OF 7
862D03



ELEVATION

PLAN VIEW

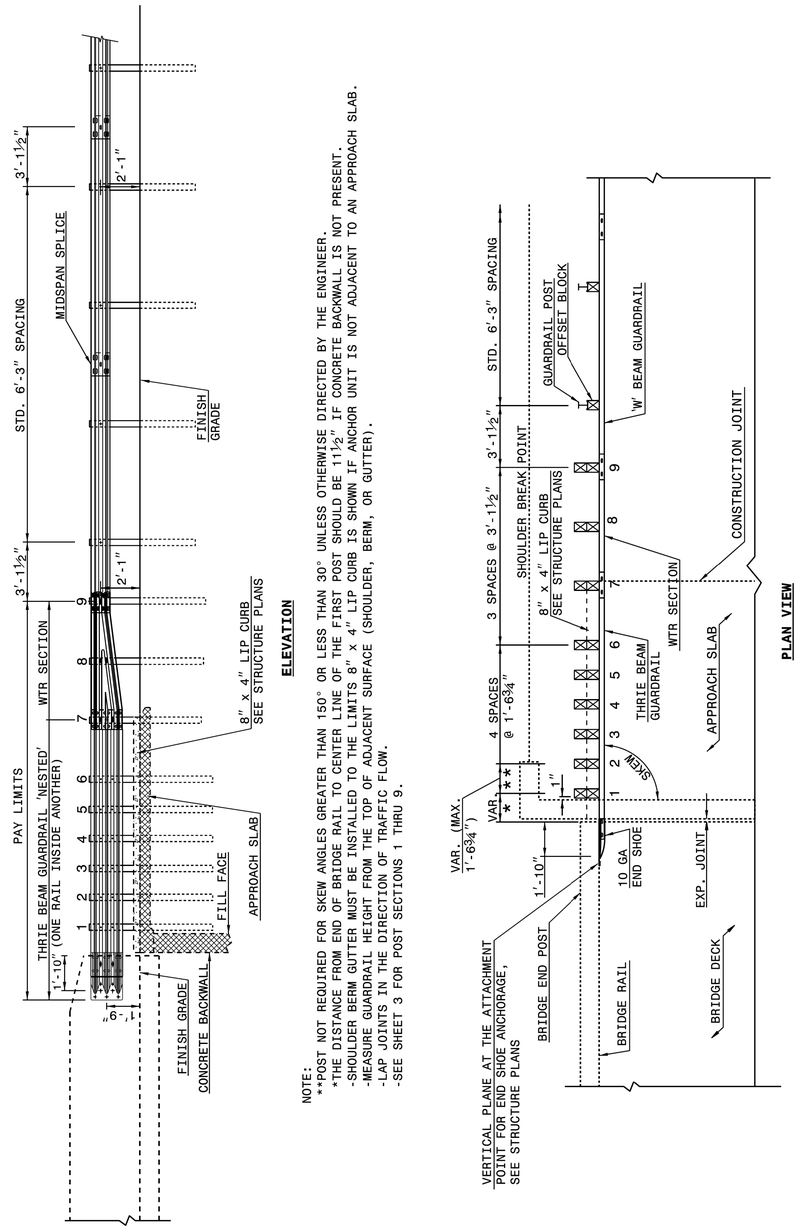
GUARDRAIL ANCHOR UNIT, TYPE III
FOR ATTACHMENT TO RAIL ON BRIDGE

NOTE:
**POST NOT REQUIRED FOR SKEW ANGLES GREATER THAN 150° OR LESS THAN 30° UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
*THE DISTANCE FROM END OF BRIDGE RAIL TO CENTER LINE OF THE FIRST POST SHOULD BE 11½" IF CONCRETE BACKWALL IS NOT PRESENT.
-SHOULDER BERM GUTTER MUST BE INSTALLED TO THE LIMITS 8" x 4" LIP CURB IS SHOWN IF ANCHOR UNIT IS NOT ADJACENT TO AN APPROACH SLAB.
-MEASURE GUARDRAIL HEIGHT FROM THE TOP OF ADJACENT SURFACE (SHOULDER, BERM, OR GUTTER).
-LAP JOINTS IN THE DIRECTION OF TRAFFIC FLOW.
-SEE SHEET 3 FOR POST SECTIONS 1 THRU 9.

STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR
STRUCTURE ANCHOR UNITS
GUARDRAIL ANCHOR UNIT, TYPE III
FOR ATTACHMENT TO RAIL ON BRIDGE
- SUB REGIONAL TIER

SHEET 2 OF 7
862D03



ELEVATION

PLAN VIEW

GUARDRAIL ANCHOR UNIT, TYPE III FOR ATTACHMENT TO RAIL ON BRIDGE - SUB REGIONAL TIER

NOTE:
**POST NOT REQUIRED FOR SKEW ANGLES GREATER THAN 150° OR LESS THAN 30° UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
*THE DISTANCE FROM END OF BRIDGE RAIL TO CENTER LINE OF THE FIRST POST SHOULD BE 11½" IF CONCRETE BACKWALL IS NOT PRESENT.
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-MEASURE GUARDRAIL HEIGHT FROM THE TOP OF ADJACENT SURFACE (SHOULDER, BERM, OR GUTTER).
-LAP JOINTS IN THE DIRECTION OF TRAFFIC FLOW.
-SEE SHEET 3 FOR POST SECTIONS 1 THRU 9.

7/26/2018

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER Joel S. Howerton

DocuSigned by:
Joel S. Howerton
873F3D17DCDC45F...

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CONTRACT STANDARDS AND DEVELOPMENT UNIT
Office 919-707-6950 FAX 919-250-4119

SEE TITLE BLOCK

ORIGINAL BY: J HOWERTON DATE: 06-22-12
MODIFIED BY: _____ DATE: _____
CHECKED BY: _____ DATE: _____
FILE SPEC.: _____

14-DEC-2017 10:36
S:\Contracts\Contracts\Special Details\jhowerton\Standard Drawings\2018 Standard Drawings\Details in Lieu of Standards\Division 8\0862d0301.dgn
jhowerton AT CSD-292595

SUMMARY OF EARTHWORK

IN CUBIC YARDS

Station	Station	Uncl. Excav.	Embank. +%	Borrow	Waste
-L- Sta. 12+00.00	-L- Sta. 14+18.75	97	709	612	
-L- Sta. 15+86.25	-L- Sta. 17+50.00	143	269	126	
SUBTOTALS:		240	978	738	
PROJECT TOTALS		240	978	738	
EST. 5% REPLACE TOPSOIL ON BORROW PIT				37	
GRAND TOTALS:		240		775	
SAY:		**260**		**820**	

UNDERCUT EXCAVATION = 400 CY (Contingency)
SELECT GRANULAR MATERIAL = 400 CY (Contingency)
GEOTEXTILE FOR SOIL STABILIZATION = 400 SY (Contingency)

(Total square yards of Geotextile for Soil Stabilization is only the contingent quantity and may only represent a portion of the geotextile quantity shown in the Item Sheets of the Proposal.)

Note: Approximate quantities only. Unclassified Excavation, Borrow Excavation, Fine Grading, Clearing and Grubbing, and Removal of Existing Pavement will be paid for at the contract lump sum price for Grading.

Note: Earthwork quantities are calculated by the Roadway Design Unit. These earthwork quantities are based on subsurface data provided by the Geotechnical Engineering Unit.

SHOULDER BERM GUTTER SUMMARY

IN LINEAR FEET

LINE	Station	Station	LENGTH
-L- (LT)	15+97.13	16+11.00	13.87
-L- (RT)	15+97.13	16+11.00	13.87
		TOTAL:	27.74
		SAY:	**30**

PAVEMENT REMOVAL SUMMARY

IN SQUARE YARDS

SURVEY LINE	Station	Station	LOCATION LT/RT/CL	ASPHALT REMOVAL	ASPHALT BREAKUP	CONCRETE REMOVAL	CONCRETE BREAKUP
-L-	12+00.00	14+28.59	CL	507.17			
-L-	15+66.05	17+50.00	CL	412.71			
		TOTAL:		919.88			
		SAY:		**925**			

GUARDRAIL SUMMARY

"N" = DISTANCE FROM EDGE OF LANE TO FACE OF GUARDRAIL
TOTAL SHOULDER WIDTH = DISTANCE FROM EDGE OF TRAVEL LANE TO SHOULDER BREAK POINT.
FLARE LENGTH = DISTANCE FROM LAST SECTION OF PARALLEL GUARDRAIL TO END OF GUARDRAIL
W = TOTAL WIDTH OF FLARE FROM BEGINNING OF TAPER TO END OF GUARDRAIL

G = GATING IMPACT ATTENUATOR TYPE 350
NG = NON-GATING IMPACT ATTENUATOR TYPE 350

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOUL WIDTH	FLARE LENGTH		W		ANCHORS									IMPACT ATTENUATOR TYPE 350		SINGLE FACED CONCRETE BARRIER	REMOVE EXISTING GUARDRAIL	REMOVE & STOCKPILE EXISTING GUARDRAIL	REMARKS
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	XI MOD	XI	GREU TL-3	M-350	TYPE III	CAT-1	VI MOD	BIC		G	NG				
-L-	13+45.75	14+18.75	LT	75'				14+18.75	5'-5"	8'-5"		50'		1'			1		1										
-L-	13+45.75	14+18.75	RT	75'			14+18.75		5'-5"	8'-5"	50'		1'				1		1										
-L-	15+86.25	17+00.00	LT	113.75'			15+86.25		5'-5"	8'-5"	50'		1'				1		1										
-L-	15+86.25	16+67.50	RT	81.25'				15+86.25	5'-5"	8'-5"		50'		1'			1		1										
			SUBTOTAL:	345'													4		4										
			LESS ANCHOR DEDUCTIONS:																										
			TYPE III (4@18.75)	75.00'																									
			GREU, TL-3 (4@50')	200.00'																									
			TOTAL:	70'													4		4										
			SAY:	87.5'													4		4										
			ADDITIONAL GUARDRAIL POSTS= 5 EA																										

REVISIONS

8/17/99

8/2/2018
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COMPUTED BY: EAB DATE: 10/23/2017

CHECKED BY: ECOLOGICAL ENGINEERING, LLP DATE: 10/23/2017

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

Note: Invert Elevations indicated are for Bid Purposes only and shall not be used for project construction stakeout. See "Standard Specifications For Roads and Structures, Section 300-5".

LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 48 INCHES & UNDER)

STATION	LOCATION (LT, RT, OR CL)'	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	DRAINAGE PIPE (RCP, CSP, CAAP, HDPE, or PVC) 12"	15"	18"	24"	30"	36"	42"	DO NOT USE PVC	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE	C.S. PIPE 12" .064	15" .064	18" .064	24" .064	30" .079	36" .079	42" .109	48" .109	R.C. PIPE CLASS III 12"	15"	18"	24"	30"	36"	42"	48"	R.C. PIPE CLASS IV 12"	15"	18"	24"	30"	36"	42"	48"	** " R.C. PIPE (CLASS V)	***" RC PIPE CULVERTS, CONTRACTOR DESIGN	***" RC PIPE CULVERTS, CONTRACTOR DESIGN	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	ENDWALLS STD. 838.01 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. YARDS R.C.P.	C.S.P.	QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0' THRU 5.0')	*TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B') LIN. FT. A 5.0' THRU 10.0'	B 10.0' AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G	CONCRETE TRANSITIONAL SECTION DROP INLET	CATCH BASIN	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME WITH TWO GRATES STD. 840.16	G.D.I. TYPE "A" STD. 840.17 OR 840.26	G.D.I. TYPE "B" STD. 840.18 OR 840.27	G.D.I. TYPE "D" STD. 840.19 OR 840.28	G.D.I. FRAME WITH GRATE STD. 840.20	G.D.I. FRAME WITH TWO GRATES STD. 840.22	G.D.I. (N.S.) FRAME WITH GRATE STD. 840.24	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	J.B. STD. 840.31 OR 840.32	G.D.I. (N.S. FLAT) FRAME W/ 2 GRATES STD. 840.29	T.B.D.I. STD. 840.35			DRAINAGE PIPE ELBOWS NO. & SIZE	CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71	CONC. COLLARS CL. "B" C.Y. STD. 840.72	PIPE REMOVAL LIN. FT.	REMARKS
16+06 -L-	LT	0401		170.98	168.23																																														1																			1	1							
		0401	0402		168.23	168.13																															28																																									
16+06 -L-	RT	0402		170.98	168.13																																														1																			1	1							
		0402	0403		168.13	164.00			20						X	X			X																																																								2@15'				
SHEET TOTALS									20																												28														2																			2	2			2@15'				

ABBREVIATIONS

C.B. CATCH BASIN
N.D.I. NARROW DROP INLET
D.I. DROP INLET
G.D.I. GRATED DROP INLET
G.D.I.(N.S.) (NARROW SLOT)
J.B. JUNCTION BOX
M.H. MANHOLE
T.B.D.I. TRAFFIC BEARING DROP INLET
T.B.J.B. TRAFFIC BEARING JUNCTION BOX

REVISIONS

8/17/99

7/24/2018
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USER:jroemer

8/17/99

REVISIONS

SUMMARY OF ROCK PLATING

LINE	Beginning Slope	Approx. Station	Ending Slope	Approx. Station	Location LT/RT	Rock Plating Detail No. 1/2/3/4	Riprap Class* I/II/B	SY
-L-	1.5:1	15+86.25	1.5:1	17+00.00	LT	1	II	132
							TOTAL SY:	132

*Use Class I, II or B riprap if riprap class is not shown for rock plating location.

SUMMARY OF AGGREGATE SUBGRADE/STABILIZATION

LINE	Station	Station	Aggregate Type ASU/AST	Aggregate Thickness INCHES	Shallow Undercut CY	Class IV Subgrade Stabilization TONS	Geotextile for Soil Stabilization SY	Stabilizer Aggregate TONS	Class IV Aggregate Stabilization TONS
CONTINGENCY			ASU		100	200	300		
			TOTAL CY/TONS/SY:		100	200	300*		

ASU = Aggregate Subgrade, AST = Aggregate Stabilization
*Total square yards of Geotextile for Soil Stabilization is only the estimated quantity for ASU/AST and may only represent a portion of the geotextile quantity shown in the Item Sheets of the Proposal.

7/24/2018
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REVISIONS

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
17BP.5.R.77	4

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 045230 ENGINEER MICHAEL S. BURNS, JR. — 7/26/2018 — DocuSigned by: Michael S. Burns, Jr. — D425C8CC006F437...

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 043870 ENGINEER REID B. ROBOL — 7/31/2018 — DocuSigned by: Reid B. Robol — 7074FDA3F200470...

STEWART — Firm License No. C-1051, 223 S. West St, Suite 1100, Raleigh, NC 27603, T 919.380.8750, www.stewartinc.com

ECOLOGICAL ENGINEERING — NC FIRM LICENSE No: F-1148, 1151 SE Cary Parkway, Suite 101, Cary, NC 27518, (919) 557-0929

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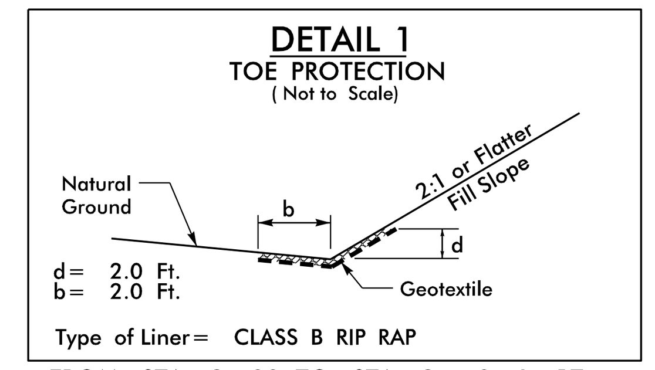
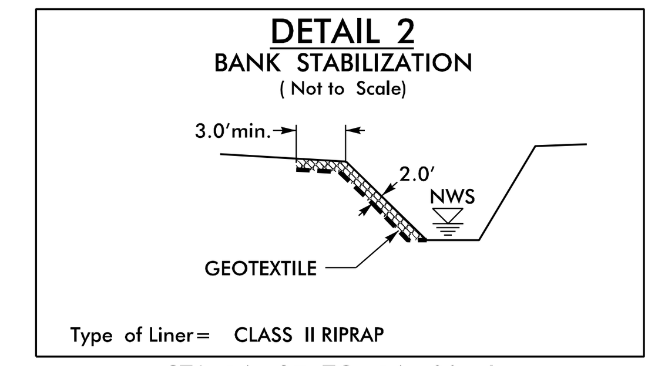
-L-

PI Sta 10+76.20	PI Sta 16+00.26	PI Sta 17+93.62
△ = 0° 58′ 48.0″ (LT)	△ = 0° 12′ 26.9″ (RT)	△ = 0° 05′ 25.6″ (LT)
D = 0° 38′ 35.2″	D = 1° 00′ 00.0″	D = 0° 01′ 29.0″
L = 152.39′	L = 20.75′	L = 365.97′
T = 76.20′	T = 10.37′	T = 182.98′
R = 8,909.33′	R = 5,729.58′	R = 231,856.26′
S_e = Exist.	S_e = Exist.	S_e = Exist.

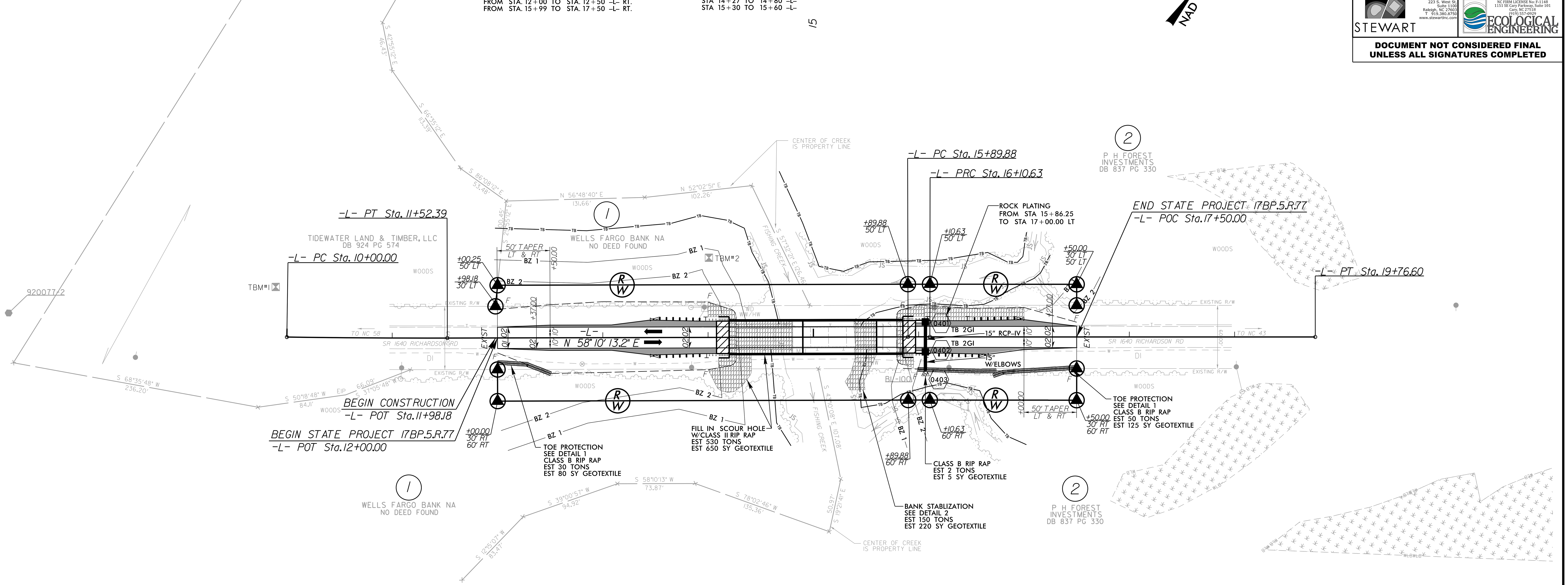


FROM STA. 12+00 TO STA. 12+50 -L- RT.
FROM STA. 15+99 TO STA. 17+50 -L- RT.

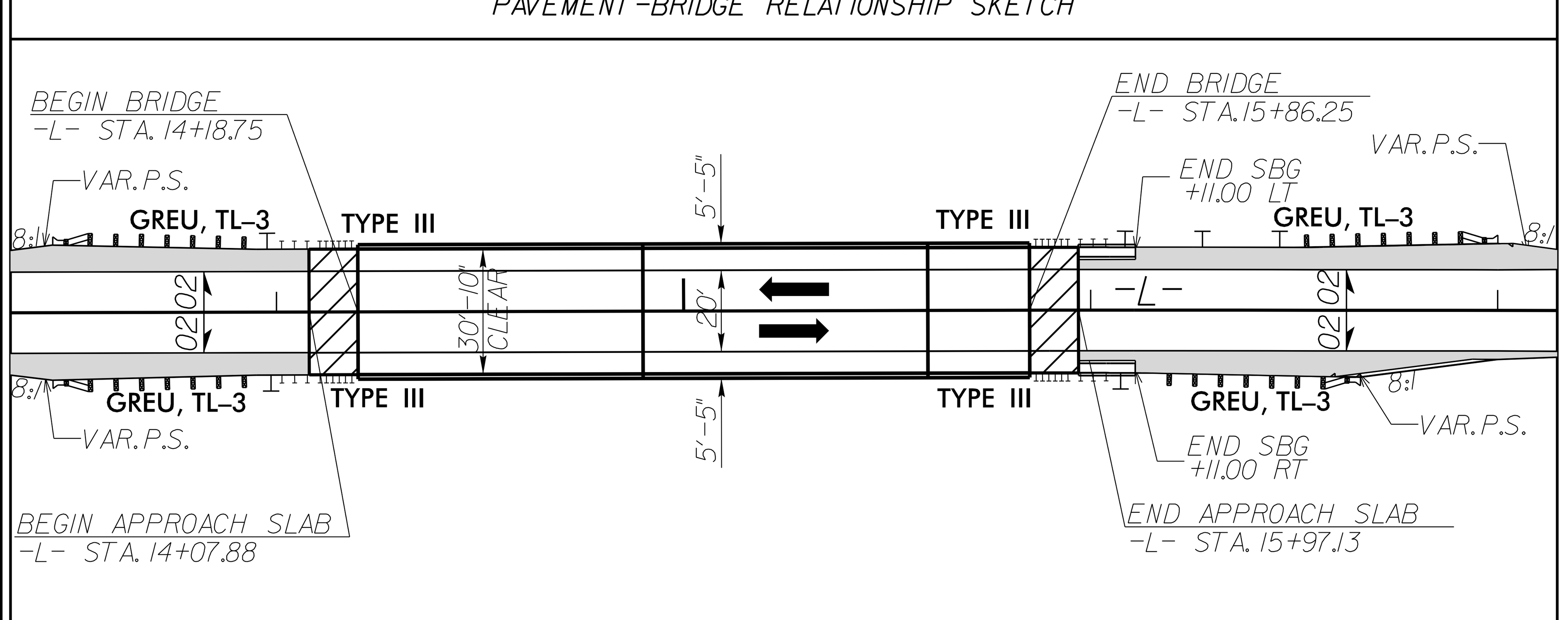


STA 14+27 TO 14+80 -L-
STA 15+30 TO 15+60 -L-

15



PAVEMENT-BRIDGE RELATIONSHIP SKETCH



NOTE: NOT TO SCALE

FOR -L- PROFILE, SEE SHEET 5

FOR STRUCTURE PLANS, SEE SHEETS S-1 THRU S-23

7/24/2018
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USER: jroemer

PROJECT REFERENCE NO.	SHEET NO.
17BP.5.R.77	5

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 045230 MICHAEL S. BURNS, JR. — 7/26/2018 — DocuSigned by: Michael S. Burns, Jr. D425C8CC006F437...

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 043870 REID B. ROBOL — 7/31/2018 — DocuSigned by: Reid B. Robol 7074FDA3F200470...

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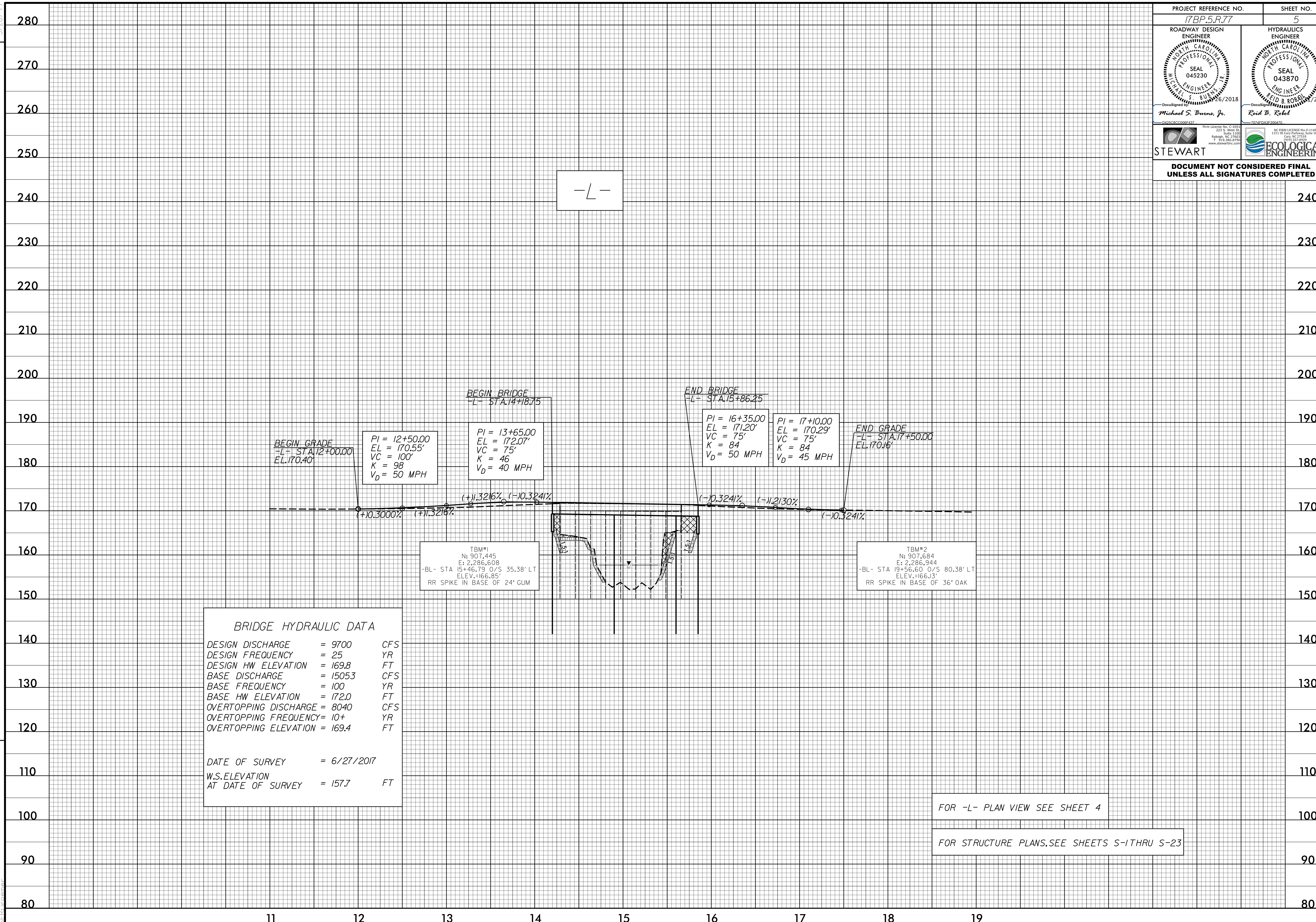


BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 9700	CFS
DESIGN FREQUENCY	= 25	YR
DESIGN HW ELEVATION	= 169.8	FT
BASE DISCHARGE	= 15053	CFS
BASE FREQUENCY	= 100	YR
BASE HW ELEVATION	= 172.0	FT
OVERTOPPING DISCHARGE	= 8040	CFS
OVERTOPPING FREQUENCY	= 10+	YR
OVERTOPPING ELEVATION	= 169.4	FT
DATE OF SURVEY	= 6/27/2017	
W.S.ELEVATION AT DATE OF SURVEY	= 157.7	FT

FOR -L- PLAN VIEW SEE SHEET 4

FOR STRUCTURE PLANS,SEE SHEETS S-1 THRU S-23

REVISIONS

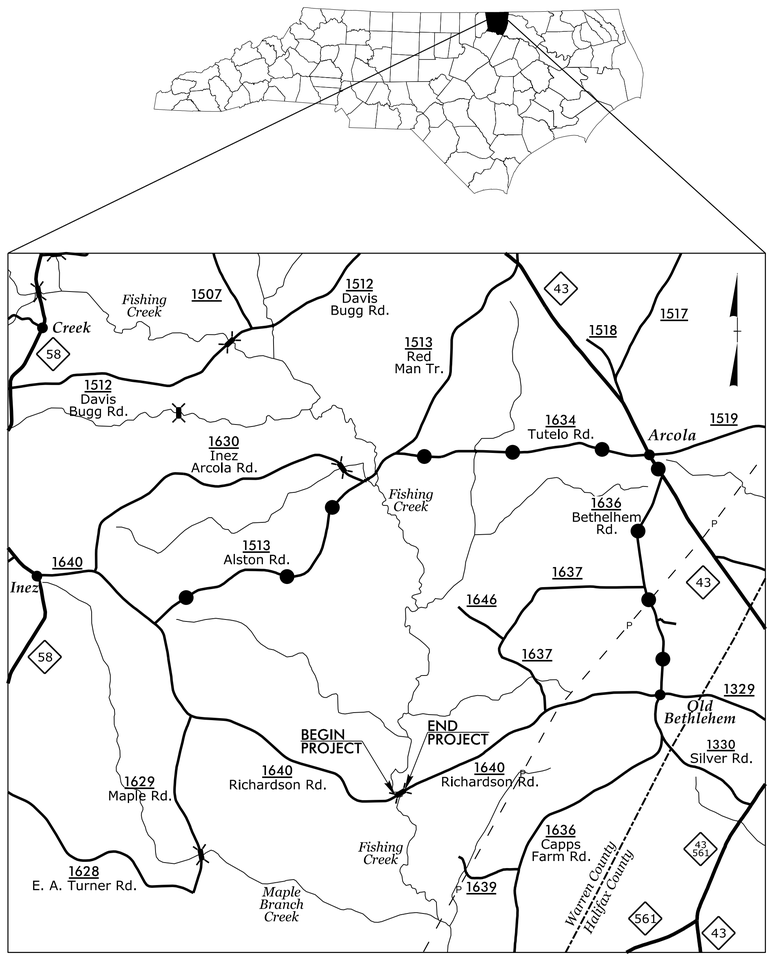
5/28/99

7/24/2018 ..\Proj\920077_RDY_PFL05.dgn USER:jroemer

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

TRANSPORTATION MANAGEMENT PLAN

WARREN COUNTY



INDEX OF SHEETS

SHEET NO.
TMP-1

17BP.5.R.77

TIP PROJECT:

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APPROVED: DocuSigned by: Michael S. Burns, Jr. D425C8CC006F437...

DATE: 7/26/2018

SEAL

SEAL 045230 NORTH CAROLINA PROFESSIONAL ENGINEER MICHAEL BURNS

WORK ZONE SAFETY & MOBILITY
"from the MOUNTAINS to the COAST"

PLANS PREPARED BY:

STEWART
223 S. WEST ST, STE 1100
RALEIGH, NC 27603
T 919.380.8750
Firm License #: C-1051
www.stewartinc.com

ANDY YOUNG, PE
PROJECT ENGINEER

MICHAEL BURNS, PE
PROJECT DESIGN ENGINEER

DIVISION OF HIGHWAYS · STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION · WORK ZONE TRAFFIC CONTROL

7/24/2018
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USER:jroemer

PROJ. REFERENCE NO.	SHEET NO.
17BP.5.R.77	TMP-1A

ROADWAY STANDARD DRAWINGS

THE FOLLOWING ROADWAY STANDARDS AS SHOWN IN "ROADWAY STANDARD DRAWINGS" - N.C. DEPARTMENT OF TRANSPORTATION - RALEIGH, N.C., DATED JANUARY 2018 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

STD. NO.	TITLE
1101.03	TEMPORARY ROAD CLOSURES
1101.11	TRAFFIC CONTROL DESIGN TABLES
1110.01	STATIONARY WORK ZONE SIGNS
1130.01	DRUM
1145.01	BARRICADES

LEGEND

GENERAL

- DIRECTION OF TRAFFIC FLOW
- DIRECTION OF PEDESTRIAN TRAFFIC FLOW
- EXIST. PVMT.
- NORTH ARROW
- PROPOSED PVMT.
- TEMP. SHORING (LOCATION PURPOSES ONLY)
- WORK AREA
- REMOVAL

SIGNALS

EXISTING PROPOSED TEMPORARY (TEMP)

PAVEMENT MARKINGS

- EXISTING LINES
- TEMPORARY LINES

TRAFFIC CONTROL DEVICES

- BARRICADE (TYPE III)
- CONE
- DRUM SKINNY DRUM TUBULAR MARKER
- TEMPORARY CRASH CUSHION
- FLASHING ARROW BOARD
- FLAGGER
- LAW ENFORCEMENT
- TRUCK MOUNTED ATTENUATOR (TMA)
- CHANGEABLE MESSAGE SIGN

TEMPORARY SIGNING

- PORTABLE SIGN
- STATIONARY SIGN
- STATIONARY OR PORTABLE SIGN

PAVEMENT MARKERS

- CRYSTAL/CRYSTAL
- CRYSTAL/RED
- YELLOW/YELLOW

PAVEMENT MARKING SYMBOLS

PAVEMENT MARKING SYMBOLS

STEWART
Firm License No. C-1051
223 S. West St,
Suite 1100
Raleigh, NC 27603
T 919.380.8750
www.stewartinc.com

APPROVED: DocuSigned by: Michael S. Burns, Jr. D425C8CC006F437...

DATE: 7/26/2018

SEAL

NORTH CAROLINA PROFESSIONAL ENGINEER MICHAEL S. BURNS SEAL 045230

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DIVISION OF HIGHWAYS · STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION · WORK ZONE TRAFFIC CONTROL

ROADWAY STANDARD DRAWINGS & LEGEND

7/24/2018
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USER:jroemer

PROJ. REFERENCE NO.	SHEET NO.
17BP.5.R.77	TMP-1B

MANAGEMENT STRATEGIES

DURING CONSTRUCTION OF PROPOSED STRUCTURE BRIDGE No. 77 OVER FISHING CREEK, SR 1640 (RICHARDSON RD.) WILL BE CLOSED TO THROUGH TRAFFIC. THROUGH TRAFFIC ON SR 1640 (RICHARDSON RD.) WILL BE MAINTAINED USING AN OFF-SITE DETOUR.

THE OFF-SITE DETOUR WILL INCLUDE SR 1513, SR 1634, NC 43, AND SR 1133 (SEE SHEET TMP-3).

GENERAL NOTES

CHANGES MAY BE REQUIRED WHEN PHYSICAL DIMENSIONS IN THE DETAIL DRAWINGS, STANDARD DETAILS, AND ROADWAY DETAILS ARE NOT ATTAINABLE TO MEET FIELD CONDITIONS OR RESULT IN DUPLICATE OR UNDESIRED OVERLAPPING OF DEVICES. MODIFICATION MAY INCLUDE: MOVING, SUPPLEMENTING, COVERING, OR REMOVAL OF DEVICES AS DIRECTED BY THE ENGINEER.

THE FOLLOWING GENERAL NOTES APPLY AT ALL TIMES FOR THE DURATION OF THE CONSTRUCTION PROJECT EXCEPT WHEN OTHERWISE NOTED IN THE PLAN OR DIRECTED BY THE ENGINEER.

SIGNING

A) PROVIDE SIGNING AND DEVICES REQUIRED TO CLOSE THE ROAD ACCORDING TO THE ROADWAY STANDARD DRAWINGS AND TRAFFIC CONTROL PLANS.

   PROVIDE SIGNING REQUIRED FOR THE OFF-SITE DETOUR ROUTE AS SHOWN IN THE TRAFFIC CONTROL PLANS.

B) COVER OR REMOVE ALL SIGNS AND DEVICES REQUIRED TO CLOSE THE ROAD WHEN ROAD CLOSURE IS NOT IN OPERATION.

   COVER OR REMOVE ALL SIGNS REQUIRED FOR THE OFF-SITE DETOUR WHEN THE DETOUR IS NOT IN OPERATION.

C) ENSURE ALL NECESSARY SIGNING IS IN PLACE PRIOR TO ALTERING ANY TRAFFIC PATTERN.

LOCAL NOTES

1. NOTIFY THE ENGINEER AT LEAST 30 DAYS PRIOR TO ANY TRAFFIC PATTERN ALTERATION.
2. NOTIFY THE WARREN COUNTY SCHOOLS TRANSPORTATION DIRECTOR OF THE BRIDGE REMOVAL 30 DAYS PRIOR TO ROAD CLOSURE.
3. NOTIFY THE WARREN COUNTY EMERGENCY MANAGEMENT SERVICES DIRECTOR OF BRIDGE REMOVAL 30 DAYS PRIOR TO ROAD CLOSURE.

PHASING

STEP 1:

PROVIDE AND MAINTAIN CHANGEABLE MESSAGE SIGNS AT EACH END OF SR 1640 (RICHARDSON RD.) FOR FOURTEEN (14) CALENDAR DAYS PRIOR TO ROAD CLOSURE, AS SHOWN ON SHEET TMP-3.

STEP 2:

USING RSD 1101.03, SHEET 1 OF 9, SHEETS TMP-2 AND TMP-3, INSTALL ROAD CLOSURE AND DETOUR SIGNS, PLACE TYPE III BARRICADES TO CLOSE SR 1640 (RICHARDSON RD.) TO THROUGH TRAFFIC, AND DETOUR TRAFFIC OFF-SITE. REMOVE CHANGEABLE MESSAGE SIGNS ONCE DETOUR IS IN PLACE.

STEP 3:

REMOVE THE EXISTING STRUCTURES.

STEP 4:

CONSTRUCT THE PROPOSED STRUCTURES AND ROADWAY.

STEP 5:

PLACE FINAL PAVEMENT MARKINGS ACCORDING TO THE PAVEMENT MARKING PLANS.

STEP 6:

OPEN SR 1640 (RICHARDSON RD.) TO TRAFFIC AND REMOVE ALL WORK ZONE TRAFFIC CONTROL DEVICES.

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Raleigh, NC 27603
T 919.380.8750
www.stewartinc.com

APPROVED: DocuSigned by: Michael S. Bruno, Jr. D425CBCC006F437...

DATE: 7/26/2018

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 045230 ENGINEER MICHAEL S BRUNO

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DIVISION OF HIGHWAYS · STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION · WORK ZONE TRAFFIC CONTROL

TRANSPORTATION OPERATIONS PLAN

7/24/2018
...\TCP\920077_TC_TMP_01B.dgn
USER:jroemer

PROJ. REFERENCE NO.	SHEET NO.
17BP.5.R.77	TMP-2

SIGN NUMBER: RICHARDSON RD BACKG COLOR: Fluorescent Orange
TYPE: STATIONARY COPY COLOR: Black
QUANTITY: SEE PLANS

SYMBOL	X	Y	WID	HT

SIGN WIDTH: 3′-6″
HEIGHT: 1′-6″
TOTAL AREA: 10.0 Sq.Ft.

BORDER TYPE: INSET
RECESS: 0.38″
WIDTH: 0.63″
RADII: 1.5″

NO. Z BARS:
LENGTH:

MAT′L: 0.080″ (2.0 mm) ALUMINUM

USE NOTES: 1,2

1. Legend and border shall be direct applied black non-reflective sheeting.
2. Background shall be NC GRADE B fluorescent orange retroreflective sheeting.

DESIGN BY: Michael Burns, PE CHECKED BY: Andy Young, PE Feb 07, 2018
PROJECT ID: 17BP.5.R.77 LOCATION: Franklin County DIV: 5

BORDER
R=1.5″
TH=0.63″
IN=0.38″

Panel Style: Traffic Control.ssi
M.U.T.C.D.: 2009 Edition

Spacing Factor is 1 unless specified otherwise

LETTER POSITIONS

Letter locations are panel edge to lower left corner

																									Series/Size Text Length
	R	I	C	H	A	R	D	S	O	N															D 2000
	4.8	8.2	9.8	13.4	16.7	20.7	24.1	27.4	30.7	34.4															32.3
	R	D																							D 2000
	17.9	21.3																							6.1

FILENAME: 920077_TC_TMP_02

NORTH CAROLINA D.O.T. SIGN DETAIL

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DATE: 7/26/2018
SEAL

NORTH CAROLINA PROFESSIONAL SEAL 045230 ENGINEER MICHAEL S. BURNS

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DIVISION OF HIGHWAYS · STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION · WORK ZONE TRAFFIC CONTROL

SPECIAL SIGN DESIGN

7/24/2018
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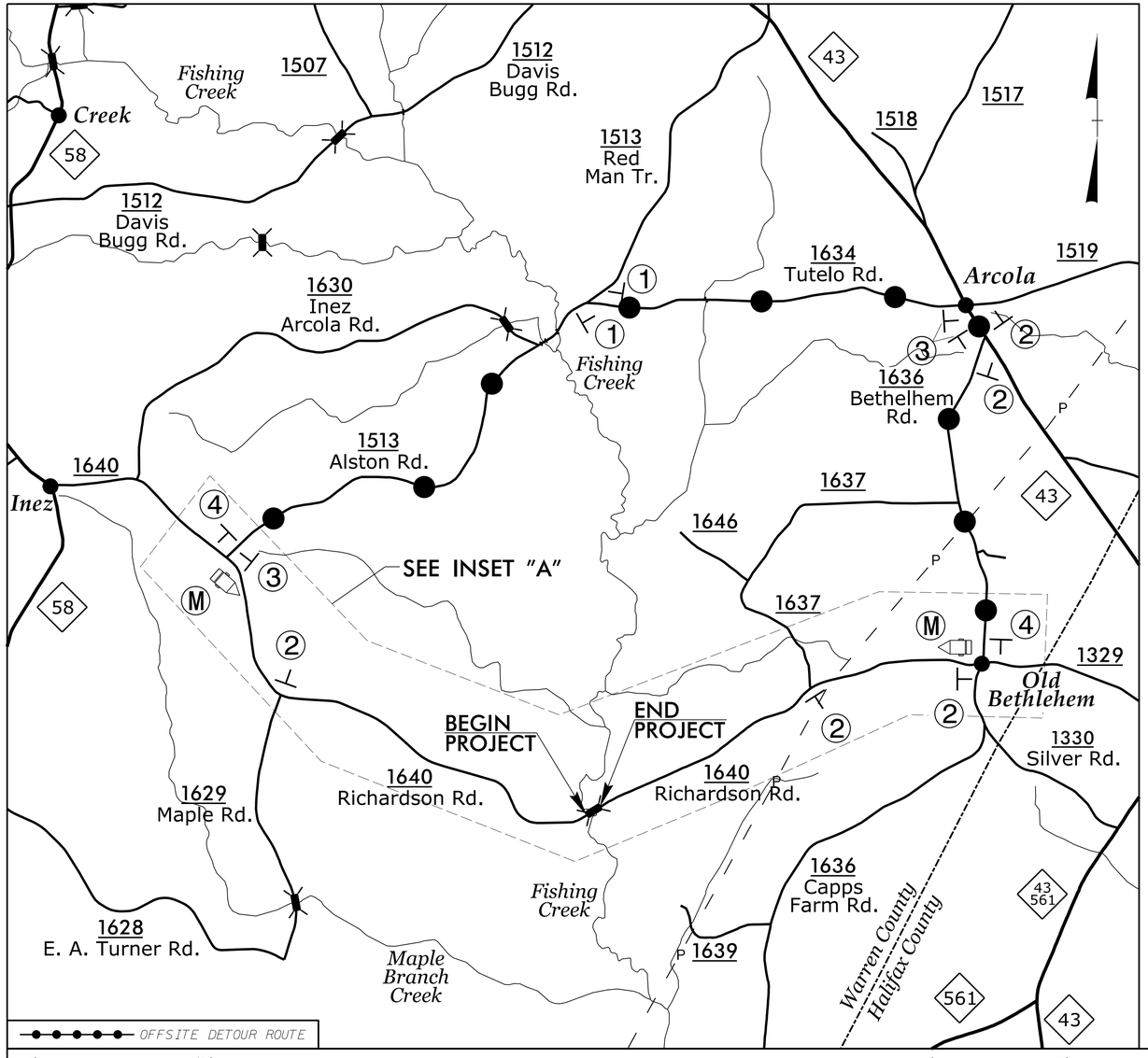
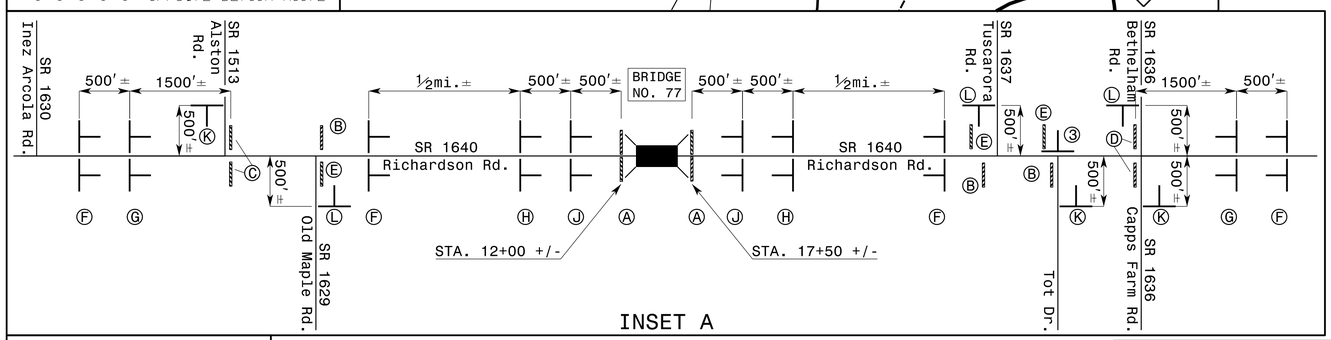
USER:jroemer

PROJ. REFERENCE NO.	SHEET NO.
17BP.5.R.77	TMP-3



OFFSITE DETOUR ROUTE



INSET A

REFER TO ROADWAY STANDARD DRAWING 1101.03, SHEET 1 OF 9 FOR APPLICABLE NOTES.

Ⓐ R11-2 48″ x 30″ — ROAD CLOSED
TYPE III BARRICADE(S)

Ⓑ R11-4 60″ x 30″ — ROAD CLOSED TO THRU TRAFFIC
TYPE III BARRICADE

Ⓒ R11-3 60″ x 30″ — ROAD CLOSED 3 MILES AHEAD LOCAL TRAFFIC ONLY — DETOUR
M4-10L 48″ x 18″
TYPE III BARRICADE

Ⓓ R11-3 60″ x 30″ — ROAD CLOSED 3 MILES AHEAD LOCAL TRAFFIC ONLY — DETOUR
M4-10R 48″ x 18″
TYPE III BARRICADE

Ⓔ R11-4 60″ x 30″ — ROAD CLOSED TO THRU TRAFFIC
TYPE III BARRICADE

Ⓕ ROAD CLOSED AHEAD
W20-3 48″ x 48″

Ⓖ DETOUR AHEAD
W20-2 48″ x 48″

Ⓗ ROAD CLOSED 1000 FT
W20-3 48″ x 48″

Ⓙ ROAD CLOSED 500 FT
W20-3 48″ x 48″

Ⓚ ROAD CLOSED AHEAD
W20-3 48″ x 48″
NEXT LEFT SP-4L 42″ X 12″

Ⓛ ROAD CLOSED AHEAD
W20-3 48″ x 48″
NEXT RIGHT SP-4R 42″ X 12″

Ⓜ

MESSAGE NO. 1	MESSAGE NO. 2
RICHARD-SON RD. CLOSED	STARTING XX-XX-XX

CHANGEABLE MESSAGE SIGN

① RICHARDSON RD — SP-1 42″ x 18″
DETOUR — M4-8 24″ x 12″
M6-3 21″ x 15″

② RICHARDSON RD — SP-1 42″ x 18″
DETOUR — M4-8 24″ x 12″
M6-1 21″ x 15″

③ RICHARDSON RD — SP-1 42″ x 18″
DETOUR — M4-8 24″ x 12″
M6-1 21″ x 15″

④ RICHARDSON RD — SP-1 42″ x 18″
END DETOUR — M4-8 A 24″ x 18″

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Raleigh, NC 27603
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APPROVED: DocuSigned by: Michael S. Bruno, Jr. — D425C8CC006F437...
DATE: 7/26/2018
SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 045230 MICHAEL S. BRUNO II
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION WORK ZONE TRAFFIC CONTROL

OFF-SITE DETOUR

7/24/2018
...\TCP\920077_TC_TMP_03.dgn
USER:jroemer

TIP: 17BP.5.R.77

CONTRACT:

TIP NO.	SHEET NO.
17BP.5.R.77	PMP-1

APPROVED: DocuSigned by: Michael S. Burns, Jr. D425C8CC006F437...

DATE: 7/26/2018

SEAL:

NORTH CAROLINA PROFESSIONAL SEAL 045230 ENGINEER MICHAEL S. BURNS

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

PAVEMENT MARKING PLAN

WARREN COUNTY

LOCATION: BRIDGE NO. 77 OVER FISHING CREEK ON SR 1640 (RICHARDSON RD.)

ROADWAY STANDARD DRAWING

THE FOLLOWING ROADWAY STANDARDS AS APPEAR IN "ROADWAY STANDARD DRAWINGS" - PROJECT SERVICES UNIT - N.C. DEPARTMENT OF TRANSPORTATION - RALEIGH, N.C., DATED JANUARY 2018 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

STD. NO.	TITLE
1205.01	PAVEMENT MARKINGS - LINE TYPES AND OFFSETS
1205.02	PAVEMENT MARKINGS - TWO-LANE AND MULTILANE ROADWAYS
1205.12	PAVEMENT MARKINGS - BRIDGES
1261.01	GUARDRAIL AND BARRIER DELINEATORS - INSTALLATION SPACING
1261.02	GUARDRAIL AND BARRIER DELINEATORS - TYPES AND MOUNTING
1262.01	GUARDRAIL END DELINEATION

PAVEMENT MARKING SCHEDULE

SYMBOL	DESCRIPTION
PA	PAINT WHITE EDGELINE (4") X2
PI	PAINT YELLOW DOUBLE CENTER (4") X2

NAD 83/NA 2011

GENERAL NOTES

THE FOLLOWING GENERAL NOTES APPLY AT ALL TIMES FOR THE DURATION OF THE CONSTRUCTION PROJECT, EXCEPT WHEN OTHERWISE NOTED IN THE PLAN, OR DIRECTED BY THE ENGINEER.

A) INSTALL PAVEMENT MARKINGS AND PAVEMENT MARKERS ON THE FINAL SURFACE AS FOLLOWS:

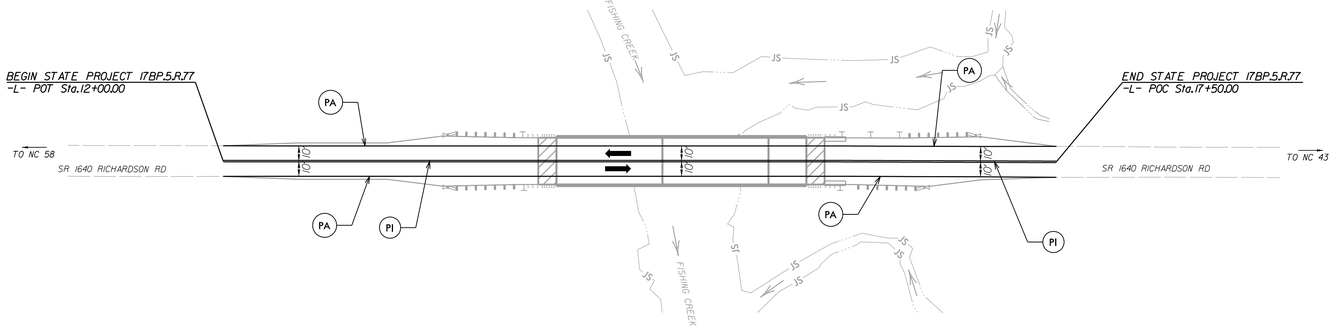
ROAD NAME	MARKING	MARKER
RICHARDSON RD	PAINT	NONE

B) PLACE TWO APPLICATIONS OF PAINT PAVEMENT MARKINGS ON THE FINAL WEARING SURFACE. PLACE THE SECOND APPLICATION OF PAINT UPON SUFFICIENT DRYING TIME OF THE FIRST.

C) TIE PROPOSED PAVEMENT MARKING LINES TO EXISTING PAVEMENT MARKING LINES.

D) REMOVE/REPLACE ANY CONFLICTING/DAMAGED PAVEMENT MARKINGS.

E) PASSING ZONES WILL BE DETERMINED IN THE FIELD AND MUST BE APPROVED BY THE ENGINEER.



PLAN PREPARED BY: STEWART

ANDY YOUNG, PE — PROJECT ENGINEER

MICHAEL BURNS, PE — PROJECT DESIGN ENGINEER

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7/24/208
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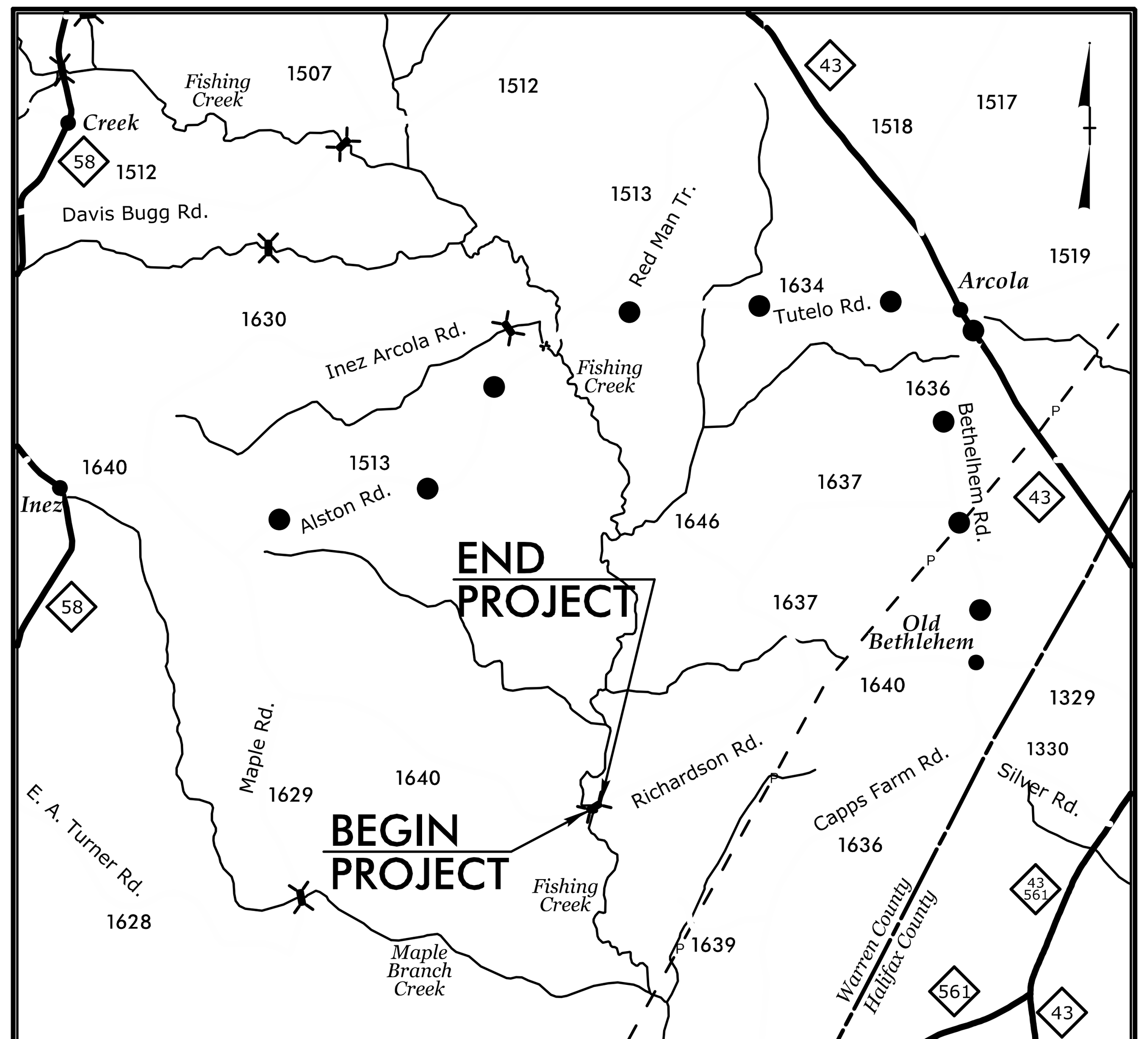
USER:jroemer

TIP PROJECT: 17BP.5.R.77

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.5.R.77	EC-1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
17BP.5.R.77	N/A	PE



VICINITY MAP

OFF-SITE DETOUR

See Sheet 1A For Index of Sheets
See Sheet 1B For Conventional Symbols

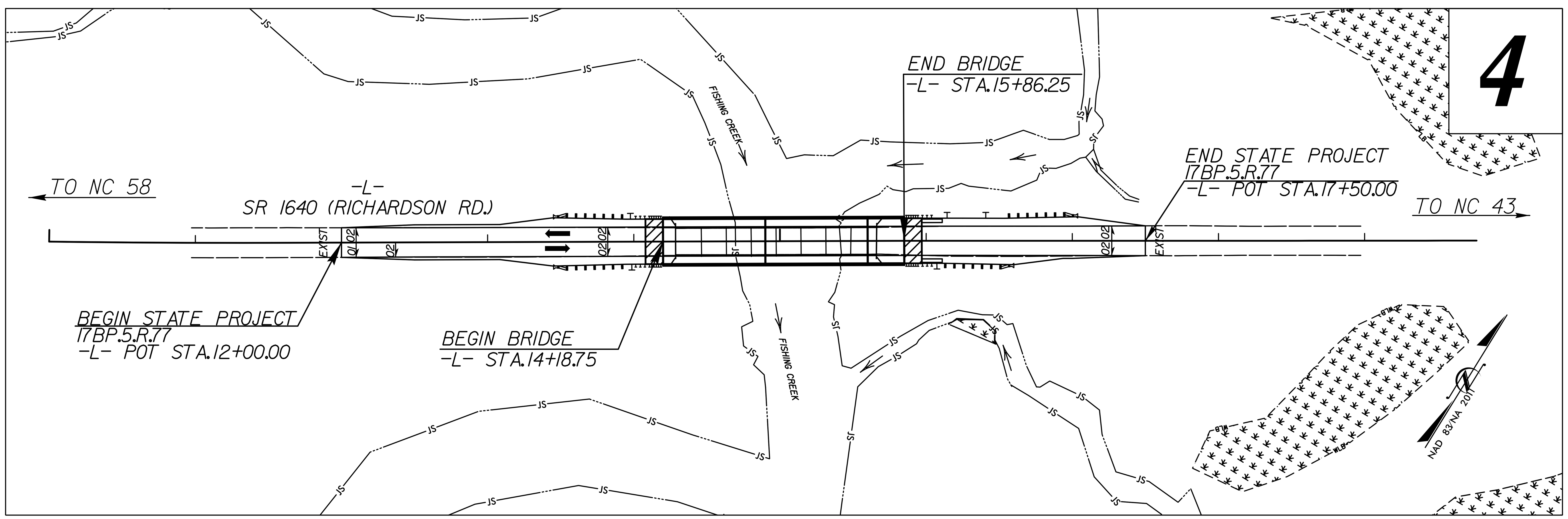
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PLAN FOR PROPOSED
HIGHWAY EROSION CONTROL

WARREN COUNTY

LOCATION: BRIDGE NO. 77 OVER FISHING CREEK ON SR 1640 (RICHARDSON RD.)

TYPE OF WORK: GRADING, DRAINAGE, PAVING, AND STRUCTURE



EROSION AND SEDIMENT CONTROL MEASURES

Std. #	Description
1630.03	Temporary Silt Ditch
1630.05	Temporary Diversion
1605.01	Temporary Silt Fence
1606.01	Special Sediment Control Fence
1622.01	Temporary Berms and Slope Drains
1630.02	Silt Basin Type B
1633.01	Temporary Rock Silt Check Type-A
	Temporary Rock Silt Check Type-A with Matting and Polyacrylamide (PAM)
1633.02	Temporary Rock Silt Check Type-B
	Wattle / Coir Fiber Wattle
	Wattle / Coir Fiber Wattle with Polyacrylamide (PAM)
1634.01	Temporary Rock Sediment Dam Type-A
1634.02	Temporary Rock Sediment Dam Type-B
1635.01	Rock Pipe Inlet Sediment Trap Type-A
1635.02	Rock Pipe Inlet Sediment Trap Type-B
1630.04	Stilling Basin
1630.06	Special Stilling Basin
	Rock Inlet Sediment Trap:
1632.01	Type A
1632.02	Type B
1632.03	Type C
	Skimmer Basin
	Tiered Skimmer Basin
	Infiltration Basin

THIS PROJECT CONTAINS EROSION CONTROL PLANS FOR CLEARING AND GRUBBING PHASE OF CONSTRUCTION.

THIS PROJECT HAS BEEN DESIGNED TO SENSITIVE WATERSHED STANDARDS.

ENVIRONMENTALLY SENSITIVE AREA(S) EXIST ON THIS PROJECT

Refer To E. C. Special Provisions for Special Considerations.

GRAPHIC SCALE

25 0 50
PLANS
25 0 50
PROFILE (HORIZONTAL)
5 0 10
PROFILE (VERTICAL)

THESE EROSION AND SEDIMENT CONTROL PLANS COMPLY WITH THE REGULATIONS SET FORTH BY THE NCG-010000 GENERAL CONSTRUCTION PERMIT EFFECTIVE AUGUST 1, 2016 AND ISSUED BY THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES DIVISION OF WATER RESOURCES.

Prepared In the Office of:

ECOLOGICAL ENGINEERING

NC FIRM LICENSE No: F-1148
1151 SE Cary Parkway
Suite 101
Cary, NC 27518
(919) 557-0929

Designed by:

REID ROBOL, PE — ***3409***
NAME — LEVEL III CERTIFICATION NO.

Reviewed In the Office of:

ROADSIDE ENVIRONMENTAL UNIT
1 South Wilmington St.
Raleigh, NC 27611

2018 STANDARD SPECIFICATIONS

Reviewed by:

DONALD PEARSON

Roadway Standard Drawings

The following roadway english standards as appear in "Roadway Standard Drawings"– Roadway Design Unit – N. C. Department of Transportation – Raleigh, N. C., dated January 2018 and the latest revison thereto are applicable to this project and by reference hereby are considered a part of these plans.

1604.01	*Railroad Erosion Control Detail*
1605.01	*Temporary Silt Fence*
1606.01	*Special Sediment Control Fence*
1607.01	*Gravel Construction Entrance*
1622.01	*Temporary Berms and Slope Drains*
1630.01	*Riser Basin*
1630.02	*Silt Basin Type B*
1630.03	*Temporary Silt Ditch*
1630.04	*Stilling Basin*
1630.05	*Temporary Diversion*
1630.06	*Special Stilling Basin*
1631.01	*Matting Installation*
1632.01	*Rock Inlet Sediment Trap Type A*
1632.02	*Rock Inlet Sediment Trap Type B*
1632.03	*Rock Inlet Sediment Trap Type C*
1633.01	*Temporary Rock Silt Check Type A*
1633.02	*Temporary Rock Silt Check Type B*
1634.01	*Temporary Rock Sediment Dam Type A*
1634.02	*Temporary Rock Sediment Dam Type B*
1635.01	*Rock Pipe Inlet Sediment Trap Type A*
1635.02	*Rock Pipe Inlet Sediment Trap Type B*
1640.01	*Coir Fiber Baffle*
1645.01	*Temporary Stream Crossing*

12:24:58 PM
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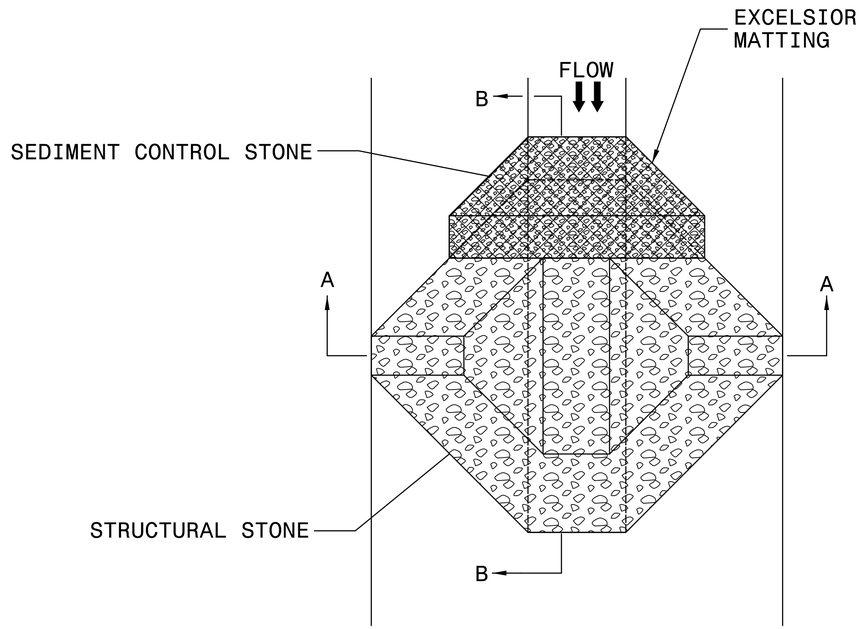
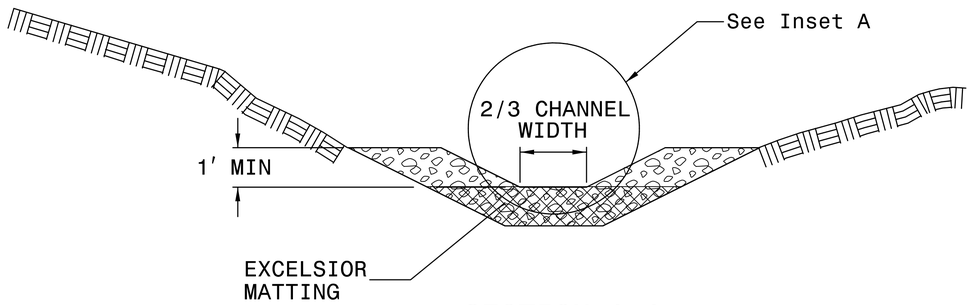
reidrobol

PROJECT REFERENCE NO.	SHEET NO.
17BP.5.R.77	EC-02
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

TEMPORARY ROCK SILT CHECK TYPE 'A' WITH EXCELSIOR MATTING AND POLYACRYLAMIDE (PAM)



PLAN



SECTION A-A

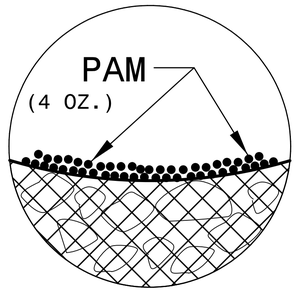
NOTES:

INSTALL TEMPORARY ROCK SILT CHECK TYPE A IN ACCORDANCE WITH ROADWAY STANDARD DRAWING NO. 1633.01.

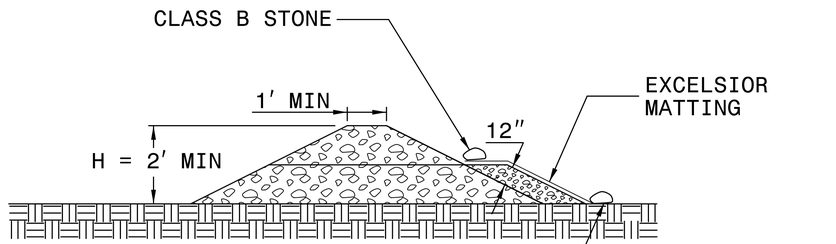
USE EXCELSIOR FOR MATTING MATERIAL AND ANCHOR MATTING SECTION AT TOP AND BOTTOM WITH CLASS B STONE.

PRIOR TO POLYACRYLAMIDE (PAM) APPLICATION, OBTAIN A SOIL SAMPLE FROM PROJECT LOCATION, AND FROM OFFSITE MATERIAL, AND ANALYZE FOR APPROPRIATE PAM FLOCCULANT TO BE APPLIED TO EACH ROCK SILT CHECK.

INITIALLY APPLY 4 OUNCES OF POLYACRYLAMIDE (PAM) TO TOP OF MATTING SECTION AND AFTER EVERY RAINFALL EVENT THAT EQUALS OR EXCEEDS 0.50 INCHES.



INSET A



SECTION B-B

NOT TO SCALE

PROJECT REFERENCE NO.	SHEET NO.
17BP.5.R.77	EC-03

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

SOIL STABILIZATION TIMEFRAMES

SITE DESCRIPTION	STABILIZATION TIME	TIMEFRAME EXCEPTIONS
PERIMETER DIKES, SWALES, DITCHES AND SLOPES	7 DAYS	NONE
HIGH QUALITY WATER (HQW) ZONES	7 DAYS	NONE
SLOPES STEEPER THAN 3:1	7 DAYS	IF SLOPES ARE 10' OR LESS IN LENGTH AND ARE NOT STEEPER THAN 2:1, 14 DAYS ARE ALLOWED.
SLOPES 3:1 OR FLATTER	7 DAYS	7 DAYS FOR SLOPES GREATER THAN 50' IN LENGTH.
ALL OTHER AREAS WITH SLOPES FLATTER THAN 4:1	7 DAYS	NONE, EXCEPT FOR PERIMETERS AND HQW ZONES.

PROJECT REFERENCE NO.	SHEET NO.
17BP.5.R.77	EC-04/CONST.04
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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NC FIRM LICENSE No: F-1148, 1151 SE Cary Parkway, Suite 101, Cary, NC 27518, (919) 557-0929, ECOLOGICAL ENGINEERING

CLEARING AND GRUBBING
EROSION CONTROL FOR
CONSTRUCTION SHEET 04

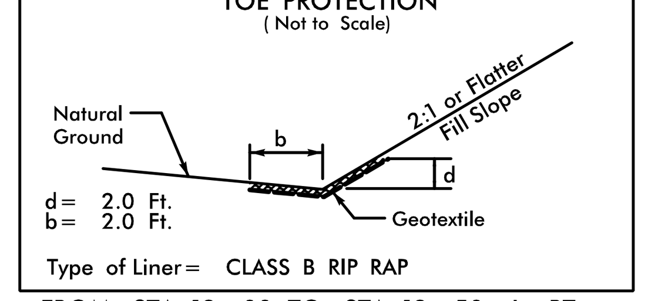
8/17/99

REVISIONS

-L-

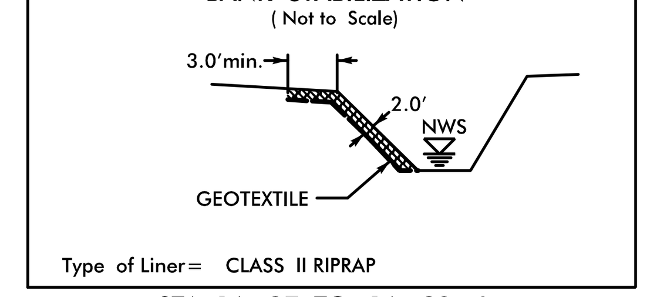
PI Sta 10+76.20	PI Sta 16+00.26	PI Sta 17+93.62
△ = 0° 58′ 48.0″ (LT)	△ = 0° 12′ 26.9″ (RT)	△ = 0° 05′ 25.6″ (LT)
D = 0° 38′ 35.2″	D = 1° 00′ 00.0″	D = 0° 01′ 29.0″
L = 152.39′	L = 20.75′	L = 365.97′
T = 76.20′	T = 10.37′	T = 182.98′
R = 8,909.33′	R = 5,729.58′	R = 231,856.26′
	Se = Exist.	Se = Exist.

DETAIL 1
TOE PROTECTION
(Not to Scale)



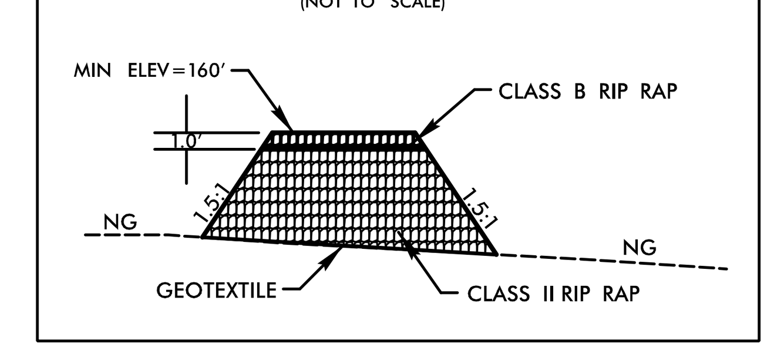
FROM STA. 12+00 TO STA. 12+50 -L- RT.
FROM STA. 15+99 TO STA. 17+50 -L- RT.

DETAIL 2
BANK STABILIZATION
(Not to Scale)



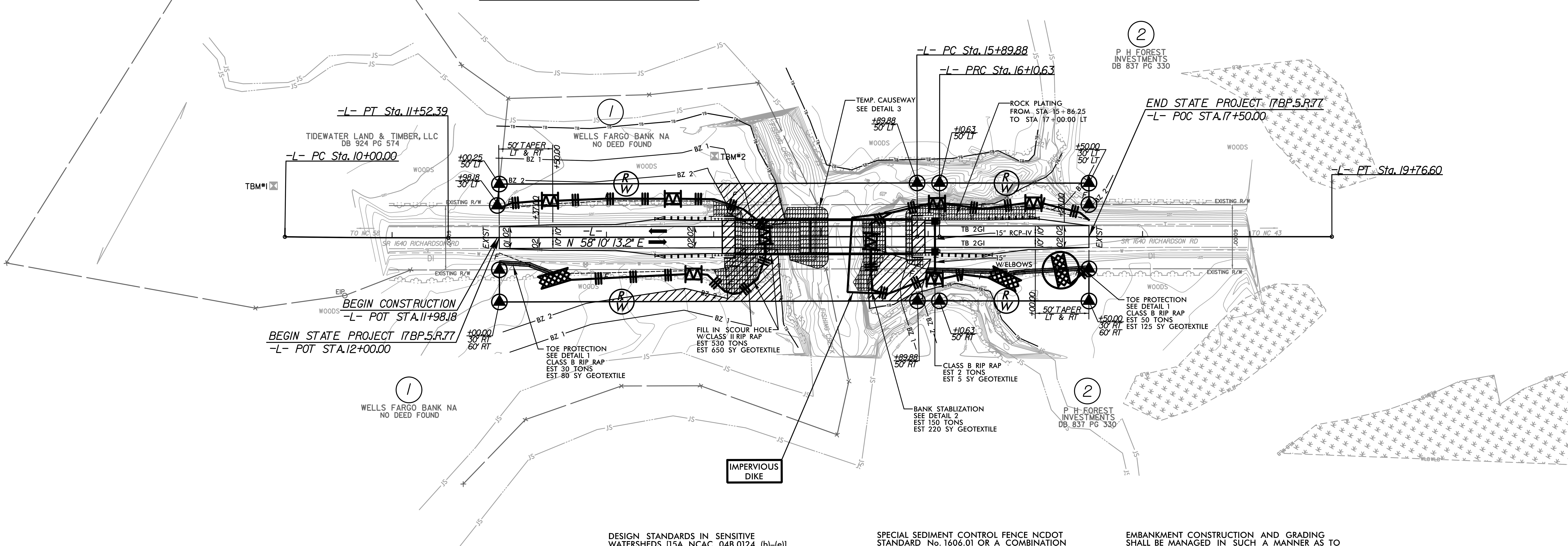
STA 14+27 TO 14+80 -L-
STA 15+30 TO 15+60 -L-

DETAIL 3
TEMPORARY CAUSEWAY
(NOT TO SCALE)

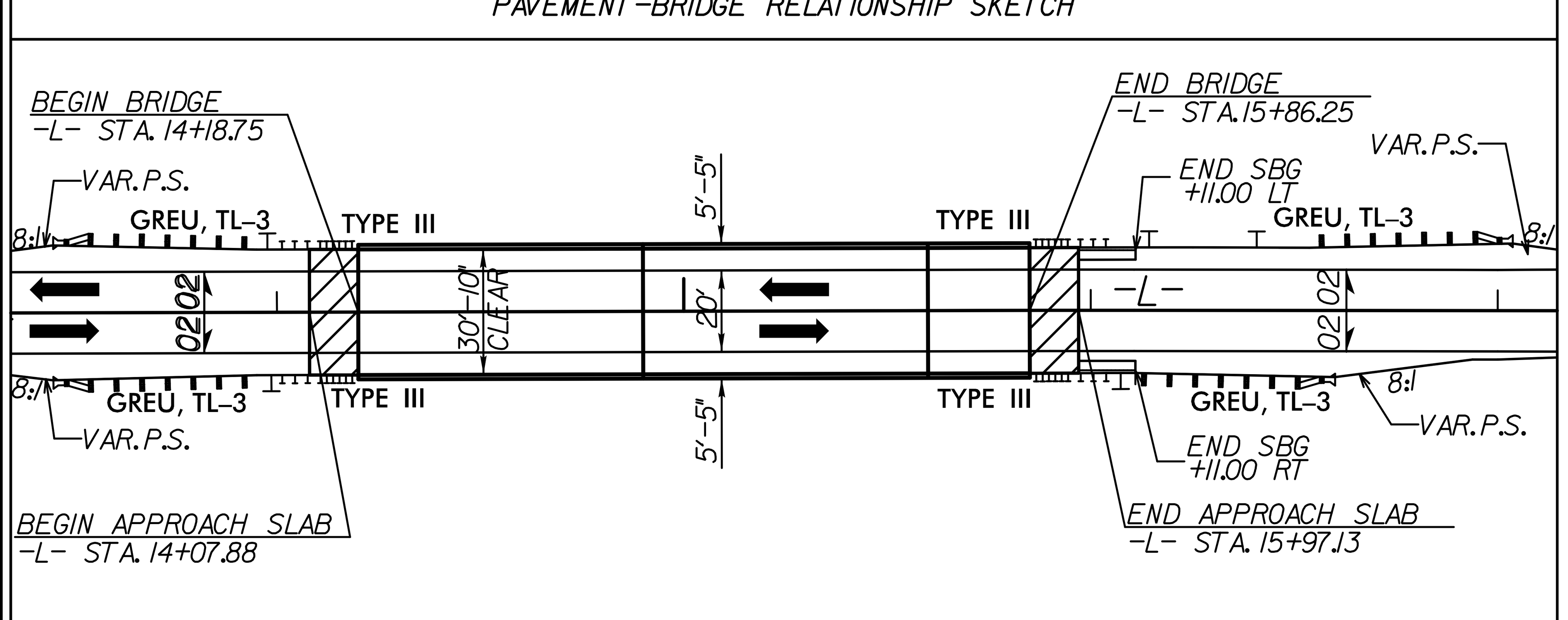


ENVIRONMENTALLY SENSITIVE AREA
SEE PROJECT SPECIAL PROVISIONS

NAD 83/NA 2011



PAVEMENT-BRIDGE RELATIONSHIP SKETCH



DESIGN STANDARDS IN SENSITIVE WATERSHEDS [15A NCAC 04B.0124 (b)-(e)] ARE INCORPORATED INTO NCDOT PROJECTS THAT OCCUR WITHIN OR UPSTREAM OF WATER BODIES THAT CONTAIN FEDERALLY PROTECTED AQUATIC SPECIES. WITHIN THE ENVIRONMENTALLY SENSITIVE AREAS, THE FOLLOWING SHAT APPLY:

- THE CONTRACTOR MAY PERFORM CLEARING OPERATIONS BUT NOT GRUBBING OPERATIONS UNTIL IMMEDIATELY PRIOR TO BEGINNING GRADING OPERATIONS.
- ONCE GRADING OPERATIONS BEGIN, WORK SHALL PROGRESS IN A CONTINUOUS MANNER UNTIL COMPLETE.
- EROSION CONTROL DEVICES SHALL BE INSTALLED IMMEDIATELY FOLLOWING THE CLEARING OPERATION.
- SEEDING MULCHING SHALL BE PERFORMED ON THE AREAS DISTURBED BY CONSTRUCTION IMMEDIATELY FOLLOWING FINAL GRADE ESTABLISHMENT.
- SEEDING MULCHING SHALL BE DONE IN STAGES ON CUT AND FILL SLOPES THAT ARE GREATER THAN 20 FEET IN HEIGHT MEASURE ALONG THE SLOPE OR GREATER THAN TWO ACRES IN AREA, WHICHEVER IS LESS

SPECIAL SEDIMENT CONTROL FENCE NCDOT STANDARD No. 1606.01 OR A COMBINATION OF SPECIAL SEDIMENT CONTROL FENCE AND STANDARD SILT FENCE WILL BE INSTALLED BETWEEN THE TOP OF THE STREAM BANK AND BRIDGE EMBANKMENT. ONCE THE DISTURBED AREAS OF THE PROJECT DRAINING TO THESE AREAS HAVE BEEN STABILIZED, THE SPECIAL SEDIMENT CONTROL FENCE AND/OR STANDARD SILT FENCE AND ALL BUILT UP SEDIMENT ADJACENT TO THESE DEVICES WILL BE REMOVED TO NATURAL GROUND AND STABILIZED WITH APPROPRIATE SEED MIX. NATIVE GRASS MIX WILL BE USED ON THE FLOODPLAIN.

ALL APPROPRIATE SEDIMENTATION AND EROSION CONTROL MEASURES, THROUGHOUT THE PROJECT LIMITS, WILL BE CLEANED OUT WHEN HALF FULL WITH SEDIMENT, TO ENSURE PROPER FUNCTION OF THE MEASURES.

COIR FIBER MATTING WILL BE INSTALLED ON THE FOOTPRINT OF UNCLASSIFIED STRUCTURE EXCAVATION NEAR THE STREAMBANKS.

EMBANKMENT CONSTRUCTION AND GRADING SHALL BE MANAGED IN SUCH A MANNER AS TO PREVENT SURFACE RUNOFF/DRAINAGE FROM DISCHARGING UNTREATED INTO THE RIPARIAN BUFFER. INSTEAD ALL INTERIM SURFACES WILL BE GRADED TO DRAIN TO TEMPORARY EROSION CONTROL DEVICES. TEMPORARY BERMS, DITCHES, ETC. WILL BE INCORPORATED, AS NECESSARY, TO TREAT TEMPORARY RUNOFF BEFORE DISCHARGING INTO THE RIPARIAN BUFFER (AS SPECIFIED IN THE NCDOT BMP MANUAL).

FOR -L- PROFILE, SEE SHEET 5

FOR STRUCTURE PLANS, SEE SHEETS S-1 THRU S-23

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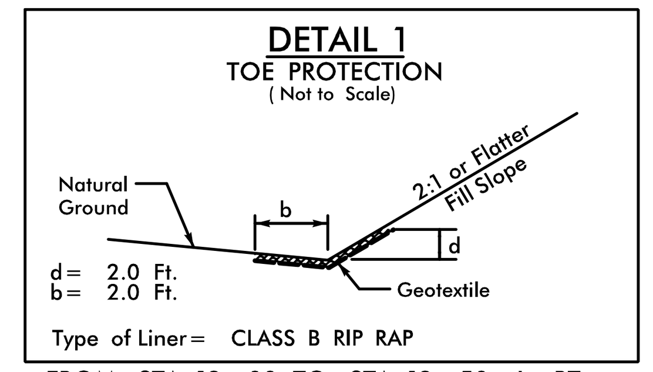
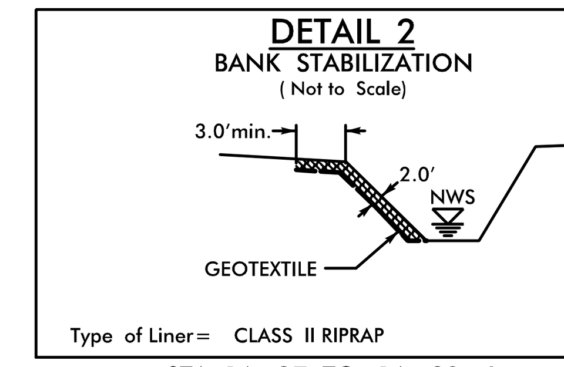
-L-

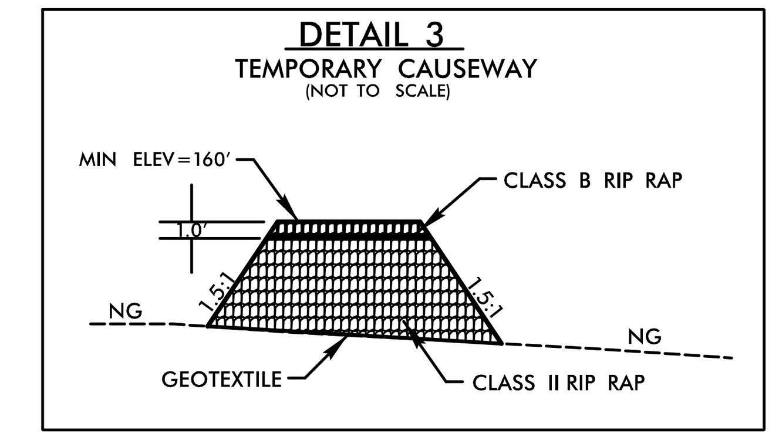
PI Sta 10+76.20	PI Sta 16+00.26	PI Sta 17+93.62
△ = 0° 58′ 48.0″ (LT)	△ = 0° 12′ 26.9″ (RT)	△ = 0° 05′ 25.6″ (LT)
D = 0° 38′ 35.2″	D = 1° 00′ 00.0″	D = 0° 01′ 29.0″
L = 152.39′	L = 20.75′	L = 365.97′
T = 76.20′	T = 10.37′	T = 182.98′
R = 8,909.33′	R = 5,729.58′	R = 231,856.26′
	Se = Exist.	Se = Exist.



FROM STA. 12+00 TO STA. 12+50 -L- RT.
FROM STA. 15+99 TO STA. 17+50 -L- RT.



STA 14+27 TO 14+80 -L-
STA 15+30 TO 15+60 -L-



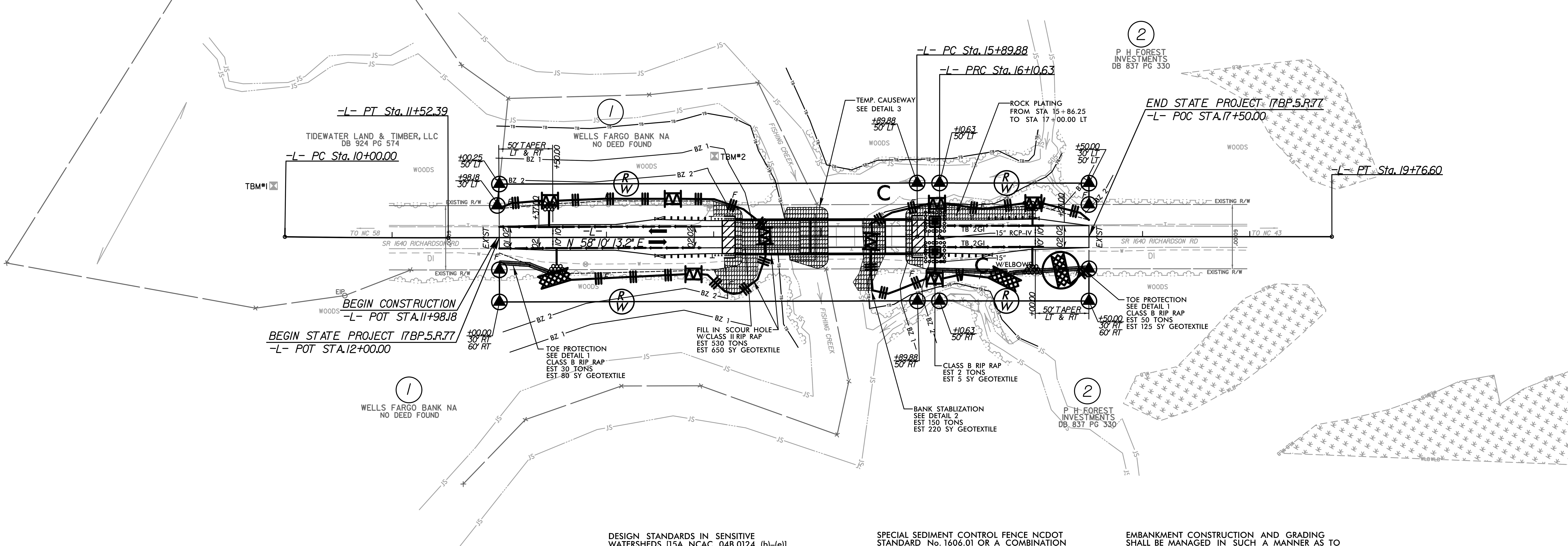
15

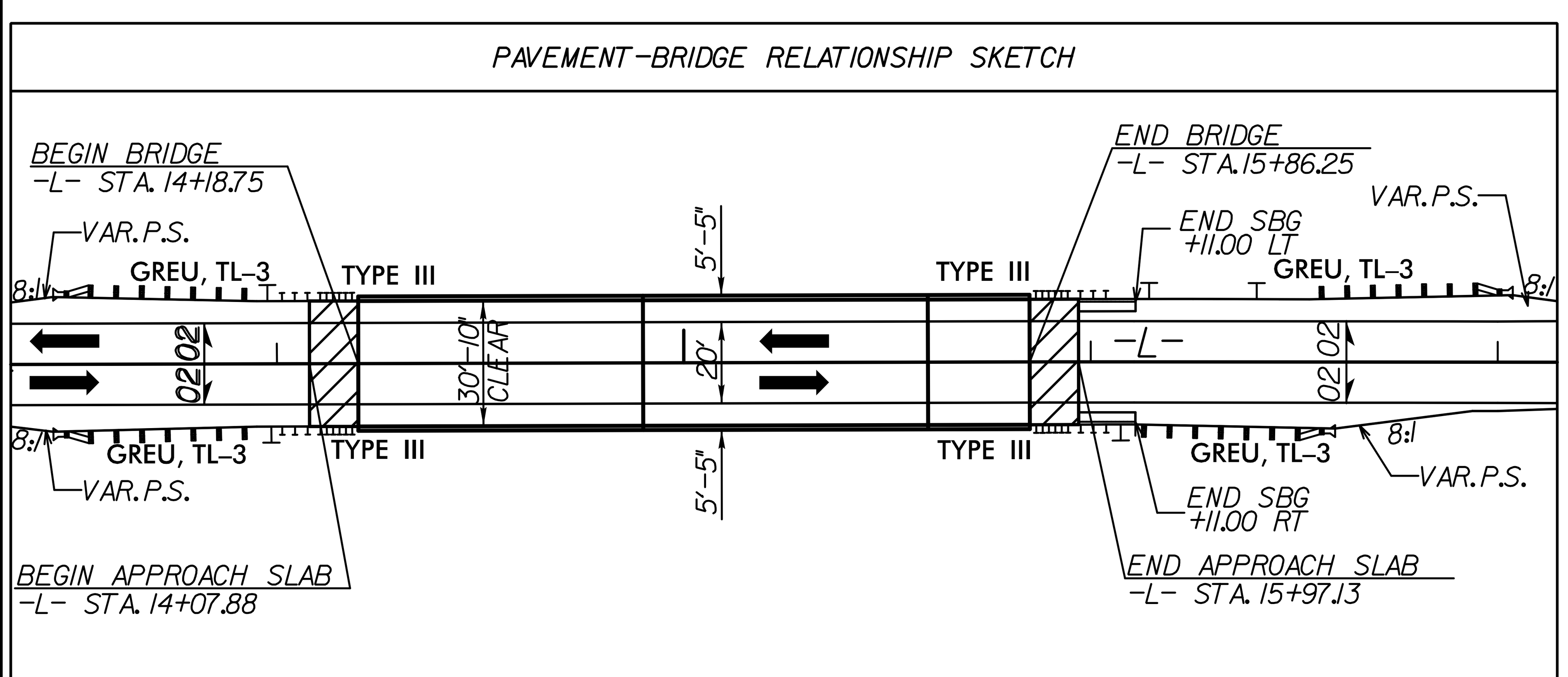
NAD 83/NA 2011

PROJECT REFERENCE NO.	SHEET NO.
17BP.5.R.77	EC-05/CONST.04
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Firm License No. C-1051
421 Fayetteville St, Suite 400
Raleigh, NC 27601
T 919.380.8750
www.stewartinc.com

NC FIRM LICENSE No: F-1148
1151 SE Cary Parkway, Suite 101
Cary, NC 27518
(919) 557-0929
ECOLOGICAL ENGINEERING





DESIGN STANDARDS IN SENSITIVE WATERSHEDS [15A NCAC 04B.0124 (b)-(e)] ARE INCORPORATED INTO NCDOT PROJECTS THAT OCCUR WITHIN OR UPSTREAM OF WATER BODIES THAT CONTAIN FEDERALLY PROTECTED AQUATIC SPECIES. WITHIN THE ENVIRONMENTALLY SENSITIVE AREAS, THE FOLLOWING SHAT APPLY:

- THE CONTRACTOR MAY PERFORM CLEARING OPERATIONS BUT NOT GRUBBING OPERATIONS UNTIL IMMEDIATELY PRIOR TO BEGINNING GRADING OPERATIONS.
- ONCE GRADING OPERATIONS BEGIN, WORK SHALL PROGRESS IN A CONTINUOUS MANNER UNTIL COMPLETE.
- EROSION CONTROL DEVICES SHALL BE INSTALLED IMMEDIATELY FOLLOWING THE CLEARING OPERATION.
- SEEDING MULCHING SHALL BE PERFORMED ON THE AREAS DISTURBED BY CONSTRUCTION IMMEDIATELY FOLLOWING FINAL GRADE ESTABLISHMENT.
- SEEDING MULCHING SHALL BE DONE IN STAGES ON CUT AND FILL SLOPES THAT ARE GREATER THAN 20 FEET IN HEIGHT MEASURE ALONG THE SLOPE OR GREATER THAN TWO ACRES IN AREA, WHICHEVER IS LESS

SPECIAL SEDIMENT CONTROL FENCE NCDOT STANDARD No. 1606.01 OR A COMBINATION OF SPECIAL SEDIMENT CONTROL FENCE AND STANDARD SILT FENCE WILL BE INSTALLED BETWEEN THE TOP OF THE STREAM BANK AND BRIDGE EMBANKMENT. ONCE THE DISTURBED AREAS OF THE PROJECT DRAINING TO THESE AREAS HAVE BEEN STABILIZED, THE SPECIAL SEDIMENT CONTROL FENCE AND/OR STANDARD SILT FENCE AND ALL BUILT UP SEDIMENT ADJACENT TO THESE DEVICES WILL BE REMOVED TO NATURAL GROUND AND STABILIZED WITH APPROPRIATE SEED MIX. NATIVE GRASS MIX WILL BE USED ON THE FLOODPLAIN.

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FOR -L- PROFILE, SEE SHEET 5

FOR STRUCTURE PLANS, SEE SHEETS S-1 THRU S-23

REVISIONS

8/17/99

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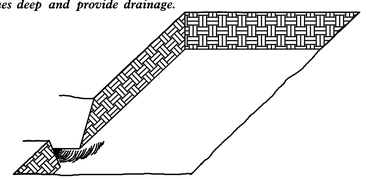
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.5.R.77	RF–1	
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION	

PLANTING DETAILS

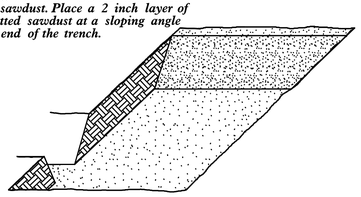
SEEDLING / LINER BAREROOT PLANTING DETAIL

HEALING IN

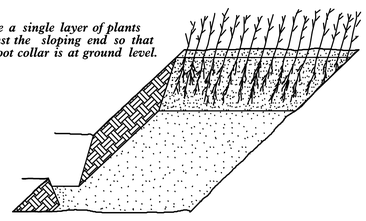
1. Locate a healing–in site in a shady, well protected area.
2. Excavate a flat bottom trench 12 inches deep and provide drainage.



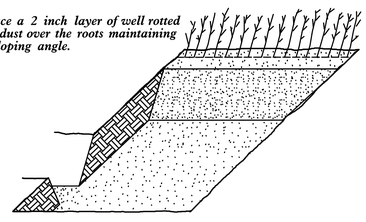
3. Backfill the trench with 2 inches well rotted sawdust. Place a 2 inch layer of well rotted sawdust at a sloping angle at one end of the trench.



4. Place a single layer of plants against the sloping end so that the root collar is at ground level.

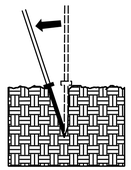


5. Place a 2 inch layer of well rotted sawdust over the roots maintaining a sloping angle.

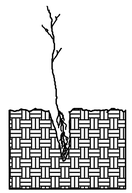


6. Repeat layers of plants and sawdust as necessary and water thoroughly.

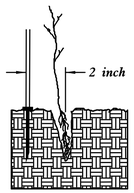
DIBBLE PLANTING METHOD
USING THE KBC PLANTING BAR



1. Insert planting bar as shown and pull handle toward planter.



2. Remove planting bar and place seedling at correct depth.



3. Insert planting bar 2 inches toward planter from seedling.

4. Pull handle of bar toward planter, firming soil at bottom.

5. Push handle forward firming soil at top.

6. Leave compaction hole open. Water thoroughly.

PLANTING NOTES:

PLANTING BAG
During planting, seedlings shall be kept in a moist canvas bag or similar container to prevent the root systems from drying.

KBC PLANTING BAR
Planting bar shall have a blade with a triangular cross section, and shall be 12 inches long, 4 inches wide and 1 inch thick at center.

ROOT PRUNING
All seedlings shall be root pruned, if necessary, so that no roots extend more than 10 inches below the root collar.

REFORESTATION

☐ TREE REFORESTATION SHALL BE PLANTED 6 FT. TO 10 FT. ON CENTER, RANDOM SPACING, AVERAGING 8 FT. ON CENTER, APPROXIMATELY 680 PLANTS PER ACRE.

REFORESTATION

MIXTURE, TYPE, SIZE, AND FURNISH SHALL CONFORM TO THE FOLLOWING:

33%	LIRIODENDRON TULIPIFERA	TULIP POPLAR	12 in – 18 in BR
33%	PLATANUS OCCIDENTALIS	AMERICAN SYCAMORE	12 in – 18 in BR
34%	BETULA NIGRA	RIVER BIRCH	12 in – 18 in BR

REFORESTATION DETAIL SHEET

N.C.D.O.T. – ROADSIDE ENVIRONMENTAL UNIT

09/08/99

TIP PROJECT: 17BP.5.R77

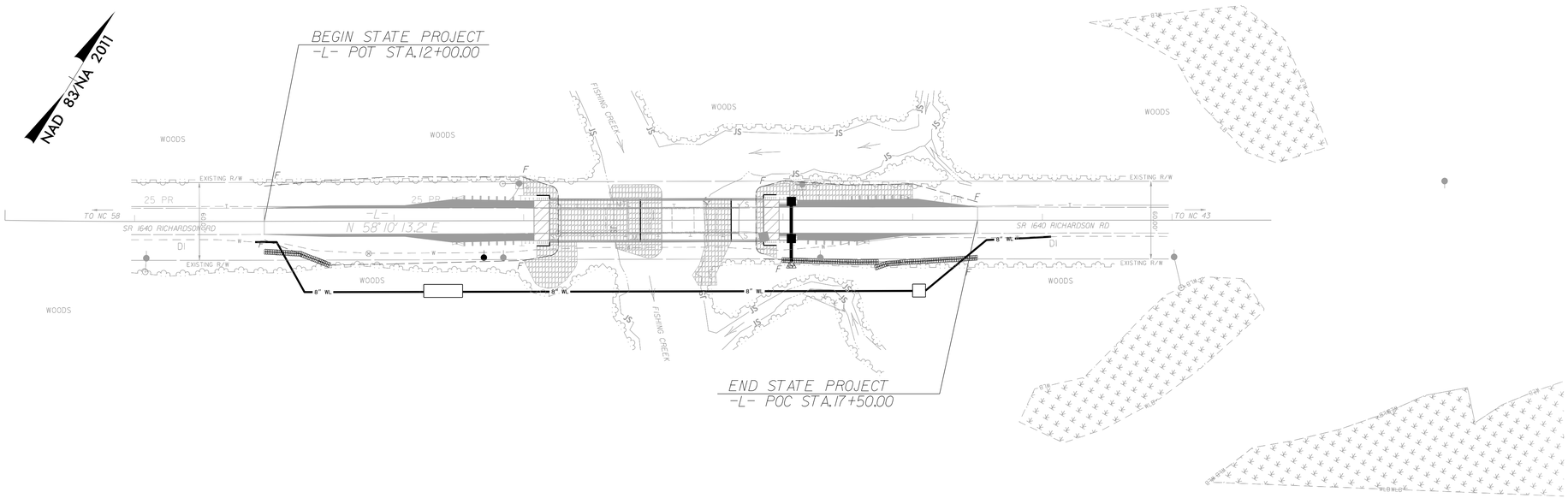
T.I.P. NO.	SHEET NO.
17BP.5.R.77	UO–1

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

UTILITIES BY OTHERS PLANS
WARREN COUNTY

LOCATION: BRIDGE NO. 77 OVER FISHING CREEK ON SR 1640 (RICHARDSON RD)

TYPE OF WORK: POWER RELOCATION, WATERLINE RELOCATION AND TELECOMMUNICATIONS REMOVAL



GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

INDEX OF SHEETS

SHEET NO.	DESCRIPTION
UO–1	TITLE SHEET
UO–2	UTILITY BY OTHERS PLAN SHEET

UTILITY OWNERS ON PROJECT

(A) WARREN COUNTY – WATER

(B) CENTURY LINK – TELECOMMUNICATIONS

(C) HALIFAX ELECTRIC – POWER

PREPARED IN THE OFFICE OF:

STEWART
421 FAYETTEVILLE ST, STE 400
RALEIGH, NC 27601
T 919.380.8750
Firm License #: C-1051
www.stewartllc.com
PROJECT #:B11001

DAVID RUGGLES, PE — PROJECT ENGINEER
ELIZABETH PHELPS, EI — PROJECT DESIGN ENGINEER

6/28/2018
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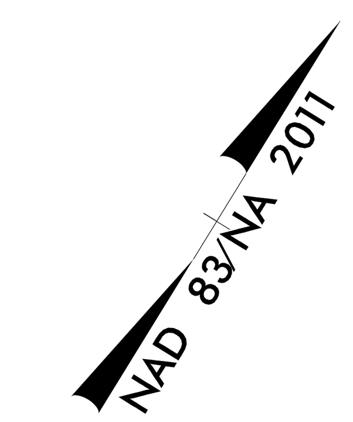
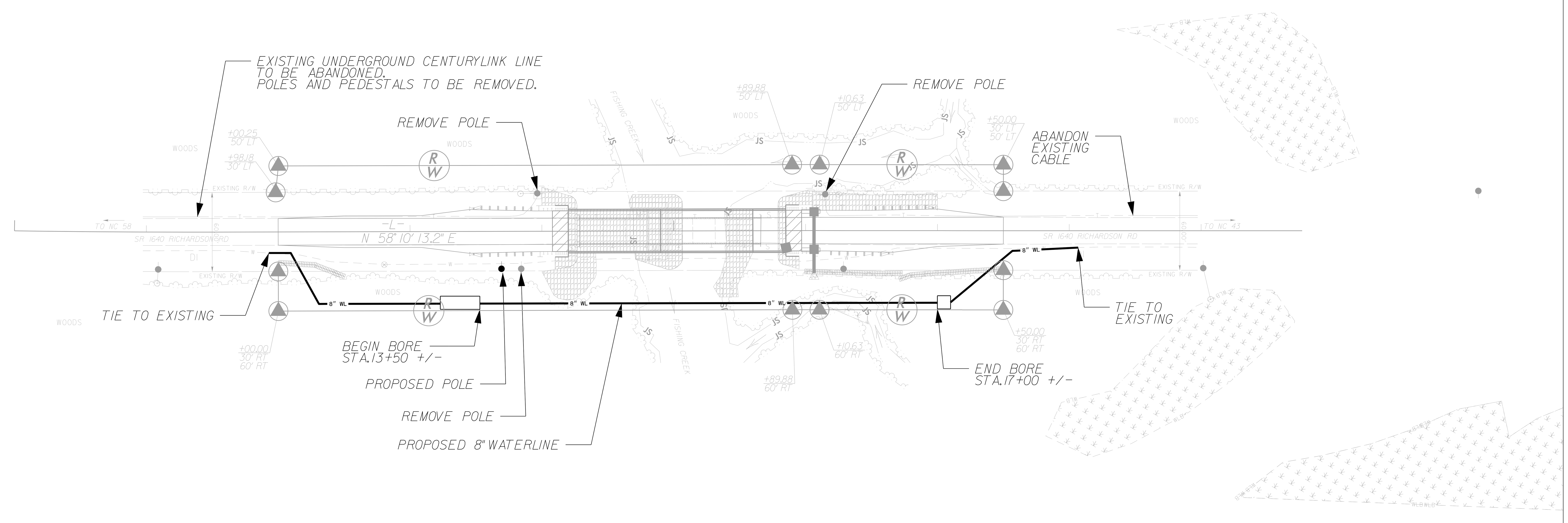
PROJECT REFERENCE NO.	SHEET NO.
17BP.5.R.77	UO-2

UTILITIES BY OTHERS

NOTE:
ALL PROPOSED UTILITY WORK SHOWN ON THIS SHEET WILL BE DONE BY OTHERS

STEWART
Firm License No. C-1051
421 Fayetteville St, Suite 400
Raleigh, NC 27601
T 919.380.8750
www.stewartinc.com





NOTES:

DESIGN STANDARDS IN SENSITIVE WATERSHEDS [15A NCAC 04B.0124 (b)-(e)] ARE INCORPORATED INTO NCDOT PROJECTS THAT OCCUR WITHIN OR UPSTREAM OF WATER BODIES THAT CONTAIN FEDERALLY PROTECTED AQUATIC SPECIES.

UBO CONTRACTOR AND INSPECTOR WILL VISUALLY MONITOR FISHING CREEK AND UNNAMED TRIBUTARIES TO FISHING CREEK DURING BORE OPERATIONS. THE CONTRACTOR WILL BE REQUIRED TO STOP ACTIVITY IF THERE IS ANY VISIBLE LOSS OF BORE FLUIDS IN THE STREAM CHANNEL AND THE INSPECTOR MUST IMMEDIATELY CONTACT THE RESIDENT ENGINEER AND THE DIVISION ENVIRONMENTAL SUPERVISOR FOR GUIDANCE ON HOW TO PROCEED WITH THE OPERATION.

SOME TREE CLEARING MAY BE DONE UNDER AND ADJACENT TO THE EXISTING OVERHEAD POWER LINE LOCATED TO THE EAST AND WEST OF SR 1640; HOWEVER, THERE WILL BE NO GRUBBING OF TREES LOCATED ALONG THE BANKS OF FISHING CREEK.

8/17/99

6/28/2018
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STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CROSS-SECTION SUMMARY

NOTE: EMBANKMENT COLUMN DOES NOT INCLUDE BACKFILL FOR UNDERCUT

Station -L-	Uncl. Exc. (cu. yd.)	Embt (cu. yd.)
12+00.00	0	0
12+50.00	37	66
13+00.00	26	121
13+50.00	12	174
14+00.00	12	185
14+18.75	10	44

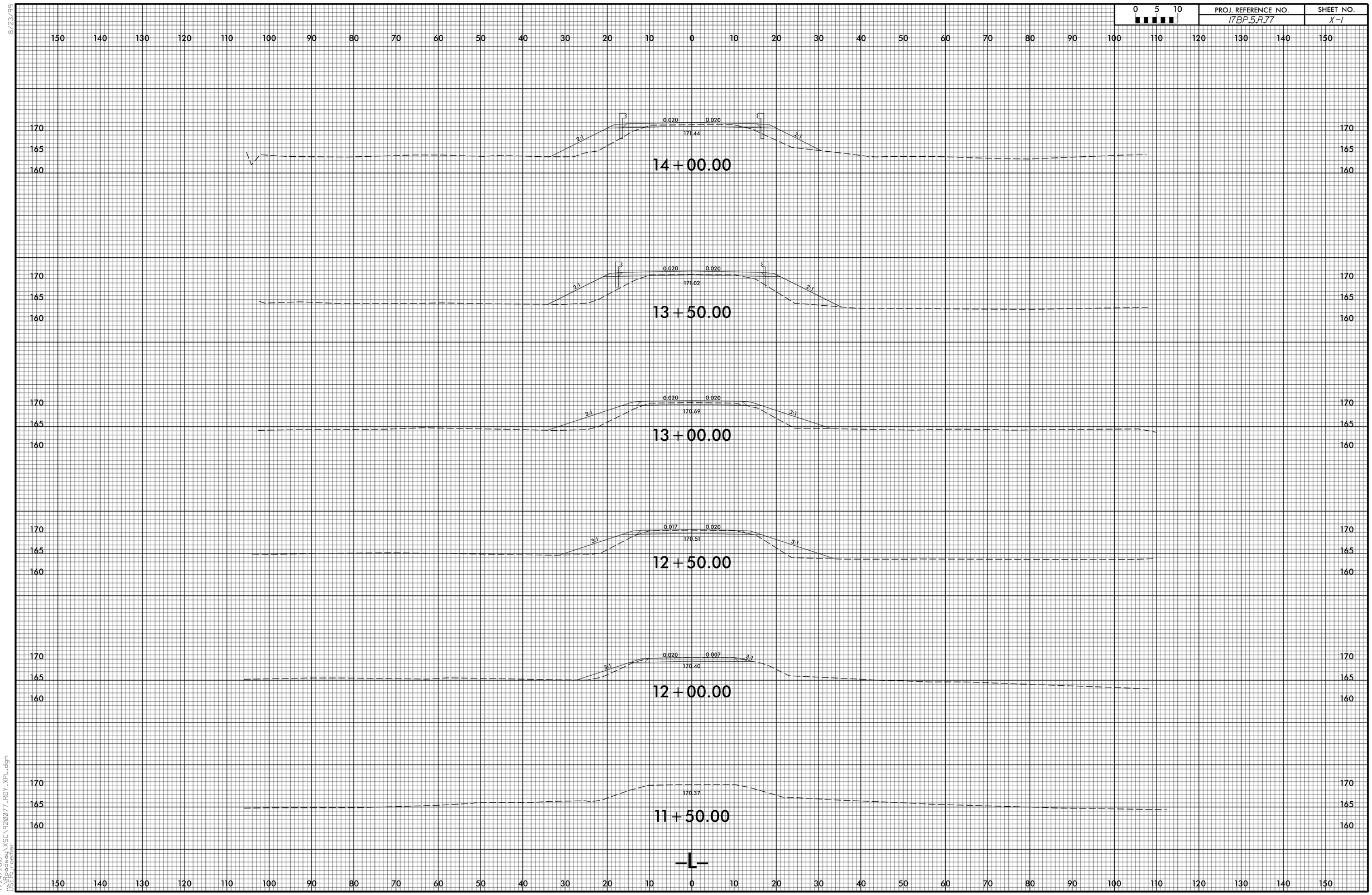
Station -L-	Uncl. Exc. (cu. yd.)	Embt (cu. yd.)
15+86.75	0	0
16+00.00	14	19
16+50.00	40	85
17+00.00	44	77
17+50.00	45	44

Approximate quantities only. Unclassified excavation, borrow excavation, fine grading, clearing and grubbing and removal of existing pavement will be paid for at the lump sum price for "Grading".

REVISIONS

8/23/99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	17BP.5.R.77	X-1



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USER: jroemer

8/23/99

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	17BP.5.R.77	X-2

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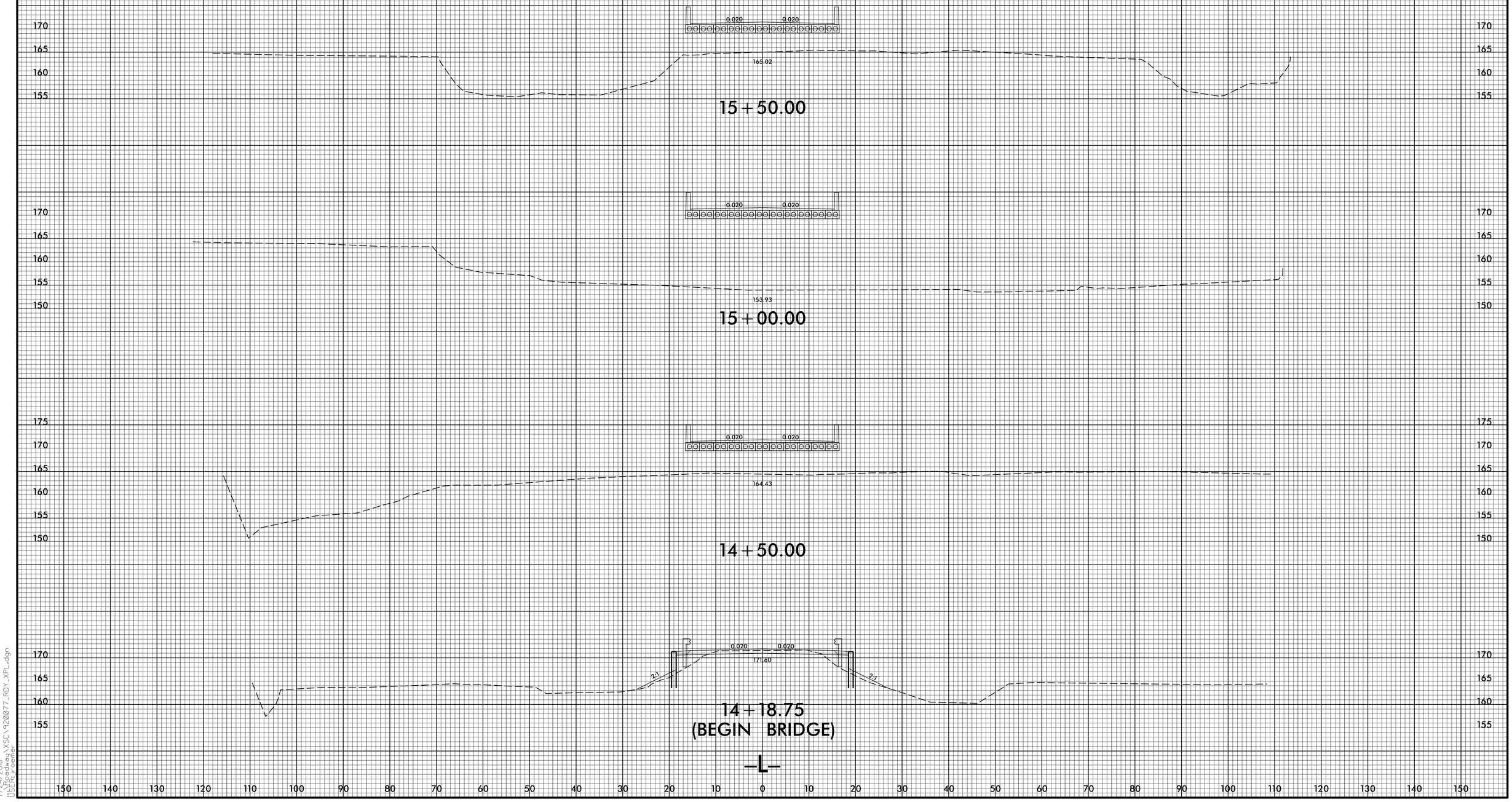

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8/23/99

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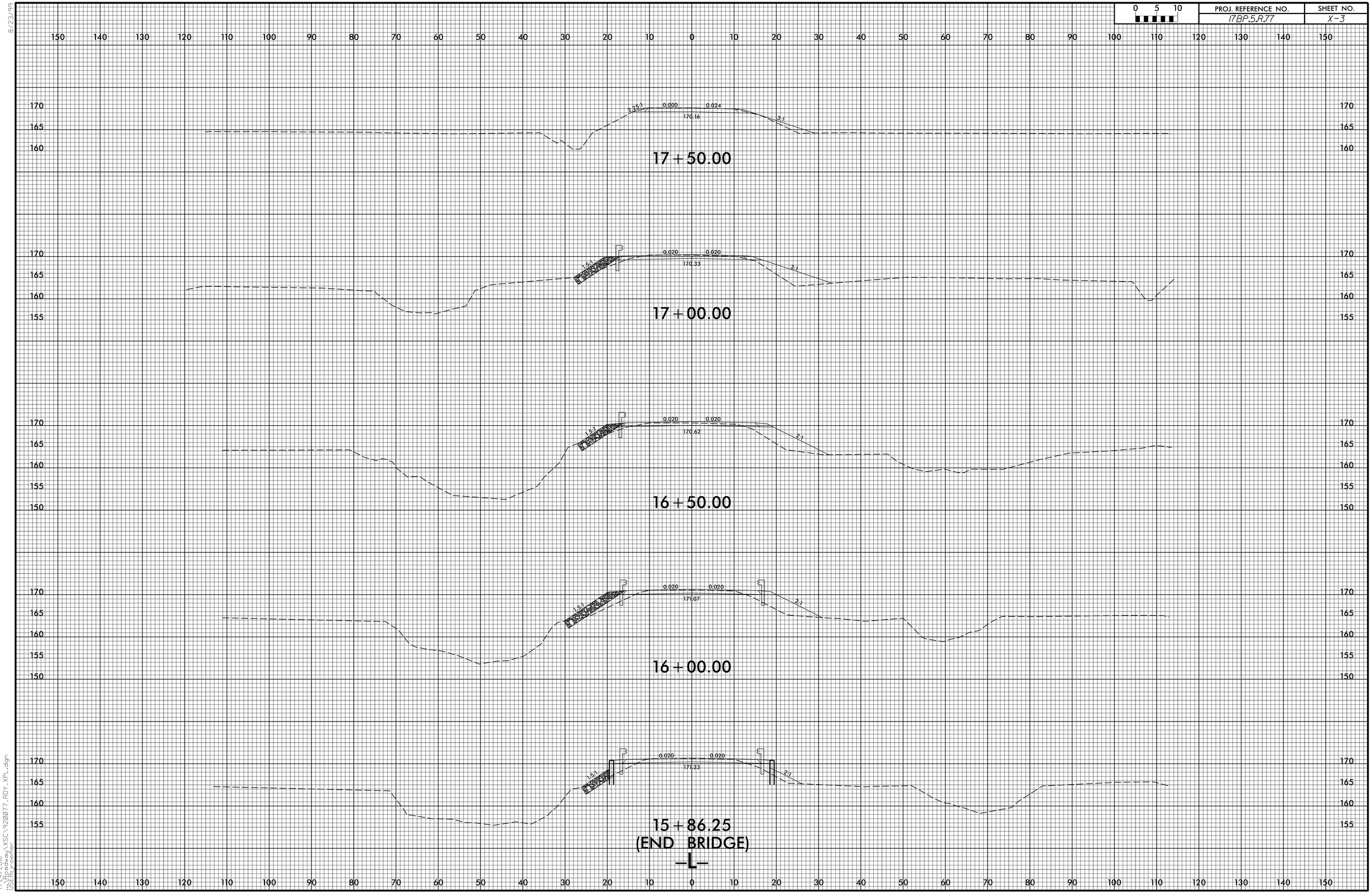

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USER: jroemer

8/23/99

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	17BP.5.R.77	X-4

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170
165
160

17C.02

18+00.00

-L-

170
165
160

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

7/24/2018
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USER: jroemer

13+50 14+00 14+50 15+00 15+50 16+00 16+50

(+)1.3216% (-)0.3241%

PI STA. 13+65.00 -L-
EL = 172.07
VC = 75'

(-)0.3241% (-)1.2130%

PI STA. 16+35.00 -L-
EL = 171.20
VC = 75'

SPAN A SPAN B SPAN C

180 170 160 150 140

FILL FACE AT END BENT 1
W.P. #1 -L- STA. 14+18.75
ELEV. 171.90

1'-6" LIMITS OF EXCAVATION (TYP. EA. END)

BEGIN FRONT SLOPE
STA. 14+10.93 -L-
G.P. ELEV. 171.92

EL. 172±

LOW CHORD
ELEV. = 169.29

FIX.

EL. 164.00
SLOPE TO DRAIN

EL. 171±

1'-0" (TYP.)

1'-6" (TYP.)

HP 12X53 STEEL PILES

UNCLASSIFIED STRUCTURE EXC. (TYP. EA. END)

1'-0" MIN. EARTH BERM (TYP. EA. END)

FILL IN SCOUR HOLE W/ CLASS II RIP RAP (ROADWAY PAY ITEM)

BASE HW (Q100)
ELEV. 172.1

EL. 161±

TEMPORARY CAUSEWAY

TOP OF DRILLED PIER EL. 158.70

NWS
ELEV. 157.7
(06/27/2017)

EL. 152±

4'-0" Ø DRILLED SHAFT

EXISTING SUBSTRUCTURE (TYP.)

EL. 165±

BANK STABILIZATION
2'-0" TH. CLASS II
RIP RAP W/ GEOTEXTILE
(ROADWAY PAY ITEM)

1'-7" MIN. BERM (TYP. EA. END)

FILL FACE AT END BENT 2
W.P. #4 -L- STA. 15+86.25
ELEV. 171.35

LOW CHORD
ELEV. = 168.76

1.5:1 SLOPE NORMAL TO CAP (TYP.)

EL. 171±

BEGIN FRONT SLOPE
STA. 15+93.98 -L-
G.P. ELEV. 171.33

EL. 165.00
SLOPE TO DRAIN

HP 12X53 STEEL PILES

HP 14X73 GALVANIZED STEEL PILES

CLASS II RIP RAP W/GEOTEXTILE (TYP. EA. END)

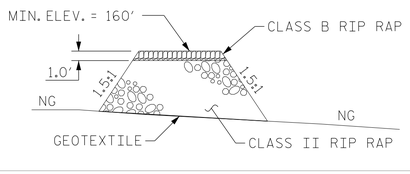
APPROX. NATURAL GROUND LINE

EL. 171±

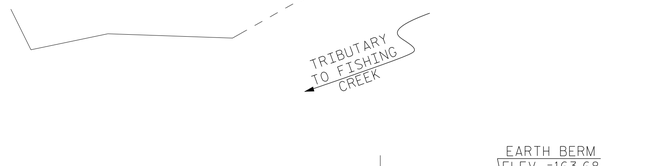
END BENT No. 1 BENT No. 1 BENT No. 2 END BENT No. 2

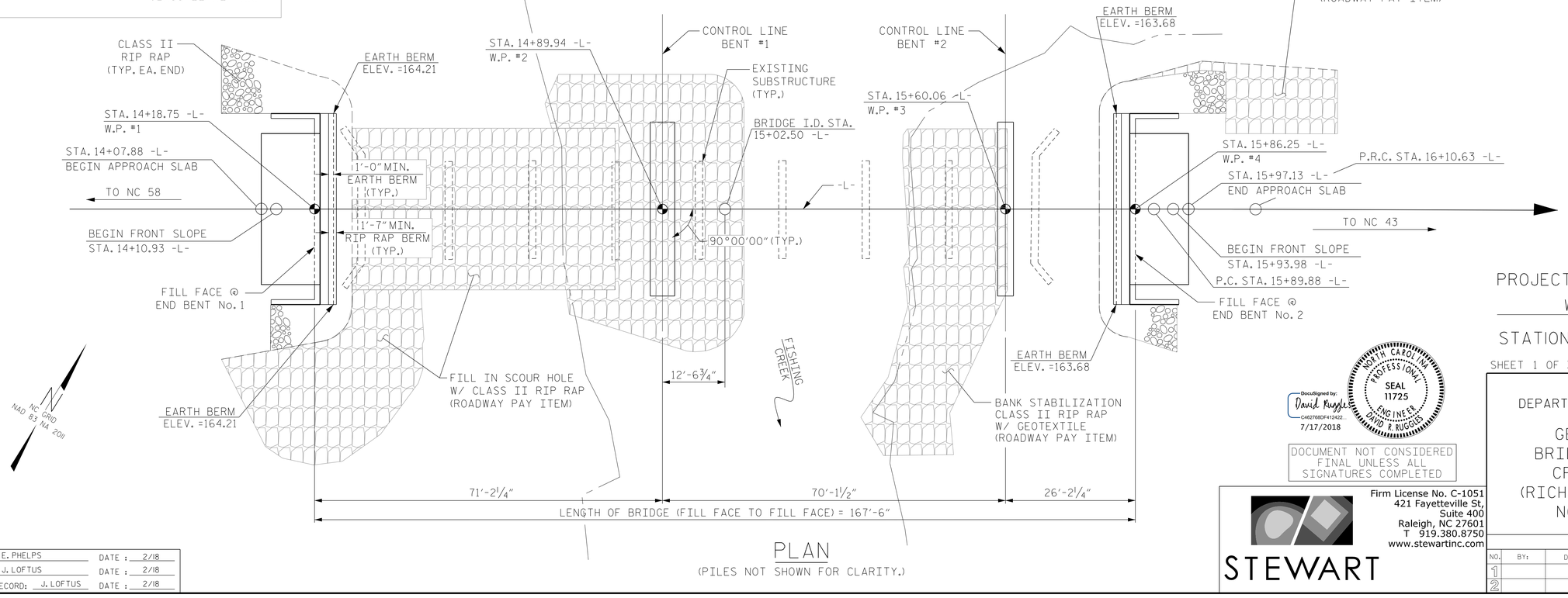
I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

TEMPORARY CAUSEWAY DETAIL
(NOT TO SCALE)



SECTION ALONG -L-





PLAN
(PILES NOT SHOWN FOR CLARITY.)

PROJECT NO. 17BP.5.R.77

WARREN COUNTY

STATION: 15+02.50 -L-

SHEET 1 OF 3 REPLACES BRIDGE 920077

DocuSigned by: David Ruggles C462768DF412422... 7/17/2018

NORTH CAROLINA PROFESSIONAL SEAL 11725 ENGINEER DAVID R. RUGGLES

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING BRIDGE OVER FISHING CREEK ON SR 1640 (RICHARDSON RD) BETWEEN NC 58 AND NC 43

Firm License No. C-1051
421 Fayetteville St,
Suite 400
Raleigh, NC 27601
T 919.380.8750
www.stewartinc.com

STEWART

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-1
1			3			TOTAL SHEETS
2			4			22

DRAWN BY:	E. PHELPS	DATE : 2/18
CHECKED BY:	J. LOFTUS	DATE : 2/18
DESIGN ENGINEER OF RECORD:	J. LOFTUS	DATE : 2/18

WARREN 77

7/17/2018
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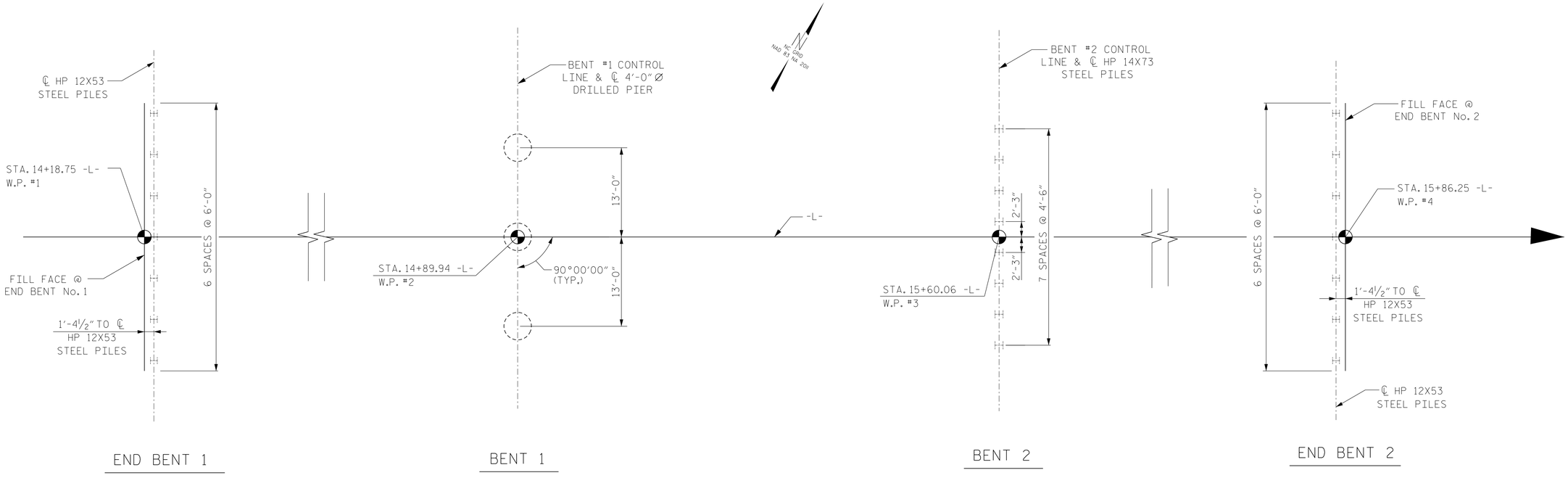
USER:vchung



FOUNDATION LAYOUT

ALL BENTS ARE PARALLEL

FOUNDATION NOTES

1) FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

2) PILES AT END BENT NO. 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 85 TONS PER PILE.

3) PILES AT BENT NO. 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 120 TONS PER PILE.

4) PILES AT END BENT NO. 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 50 TONS PER PILE.

5) DRIVE PILES AT END BENT NO. 1 TO A REQUIRED DRIVING RESISTANCE OF 145 TONS PER PILE.

6) DRIVE PILES AT BENT NO. 2 TO A REQUIRED DRIVING RESISTANCE OF 200 TONS PER PILE.

7) DRIVE PILES AT END BENT NO. 2 TO A REQUIRED DRIVING RESISTANCE OF 85 TONS PER PILE.

8) INSTALL PILES AT BENT NO. 2 TO A TIP ELEVATION NO HIGHER THAN 146 FT.

9) THE SCOUR CRITICAL ELEVATION FOR BENT NO. 2 IS ELEVATION 161 FT. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

10) FOR DRILLED PIERS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

11) DRILLED PIERS AT BENT NO. 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 425 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 65 TSF.

12) INSTALL DRILLED PIERS AT BENT NO. 1 TO A TIP ELEVATION NO HIGHER THAN 122 FT. WITH THE REQUIRED TIP RESISTANCE AND A PENETRATION OF AT LEAST 6 FT INTO ROCK AS DEFINED BY ARTICLE 411-1 OF THE STANDARD SPECIFICATIONS.

13) THE SCOUR CRITICAL ELEVATION FOR BENT NO. 1 IS ELEVATION 140 FT. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

14) PERMANENT STEEL CASINGS ARE REQUIRED FOR DRILLED PIERS AT BENT NO. 1. DO NOT EXTEND PERMANENT CASINGS BELOW ELEVATION 128 FT WITHOUT PRIOR APPROVAL FROM THE ENGINEER.

15) SID INSPECTIONS MAY BE REQUIRED FOR DRILLED PIERS. THE ENGINEER WILL DETERMINE THE NEED FOR SID INSPECTIONS. FOR SID INSPECTIONS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

16) CSL TUBES ARE REQUIRED AND CSL TESTING MAY BE REQUIRED FOR DRILLED PIERS. THE ENGINEER WILL DETERMINE THE NEED FOR CSL TESTING. FOR CSL TESTING, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

17) SPT MAY BE REQUIRED FOR DRILLED PIERS. THE ENGINEER WILL DETERMINE THE NEED FOR SPT. FOR SPT TESTING, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

DRAWN BY: E. PHELPS DATE : 2/18
CHECKED BY: J. LOFTUS DATE : 2/18
DESIGN ENGINEER OF RECORD: J. LOFTUS DATE : 2/18

DocuSigned by: David Ruggles C462768DF412422... 7/17/2018

NORTH CAROLINA PROFESSIONAL SEAL 11725 ENGINEER DAVID R. RUGGLES

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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STEWART

PROJECT NO. 17BP.5.R.77

WARREN COUNTY

STATION: 15+02.50 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

FOUNDATION LAYOUT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-2
1			3			TOTAL SHEETS
2			4			22

WARREN 77
6/29/2018
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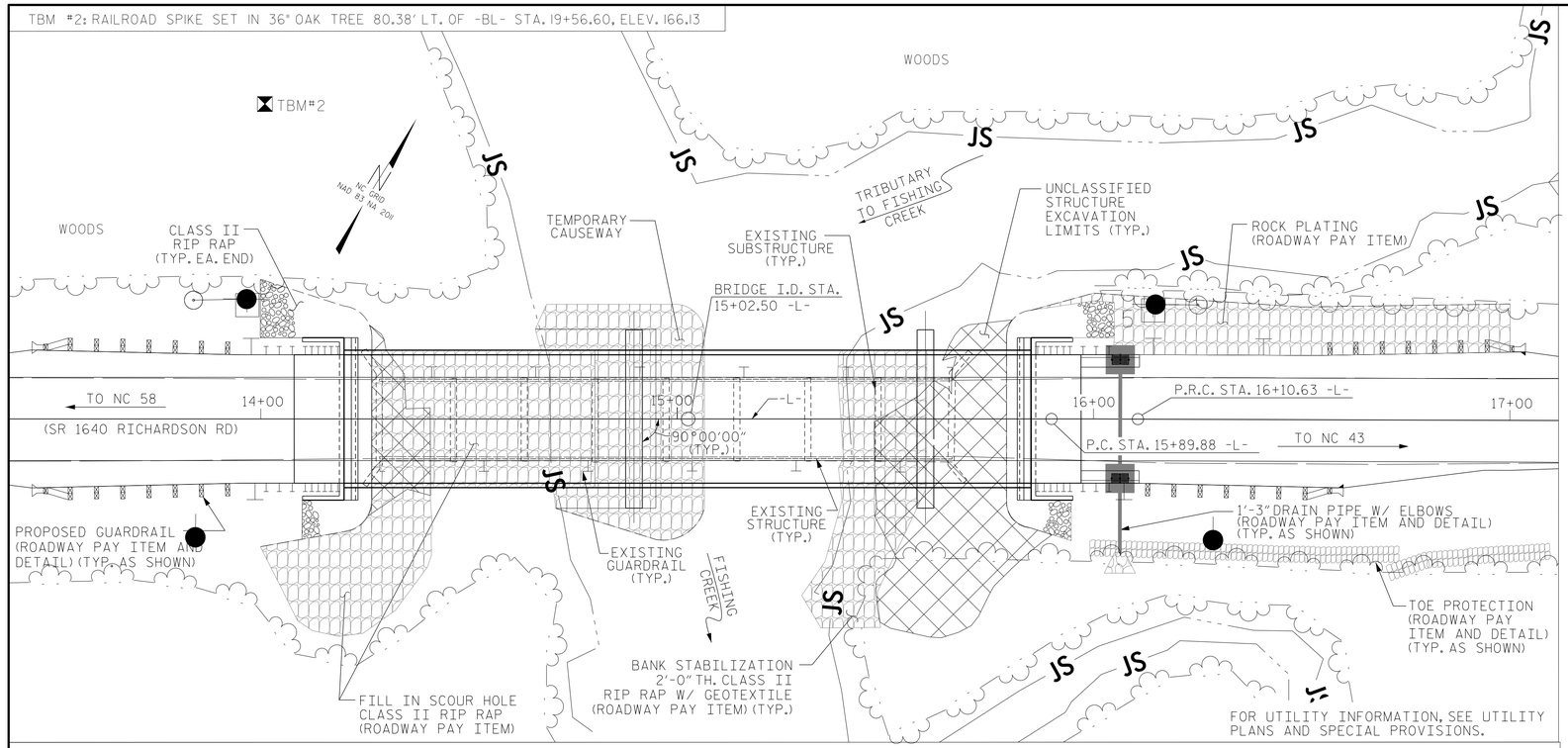

LOCATION SKETCH

GENERAL NOTES:

1. ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING
2. THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS
3. THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1
4. THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH "HEC 18 - EVALUATING SCOUR AT BRIDGES."
5. THE SUBSTRUCTURE OF THE EXISTING BRIDGE INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. SINCE THIS INFORMATION IS SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR, THE CONTRACTOR SHALL HAVE NO CLAIM WHATSOEVER AGAINST THE DEPARTMENT OF TRANSPORTATION FOR ANY DELAYS OR ADDITIONAL COST INCURRED BASED ON DIFFERENCE BETWEEN THE EXISTING BRIDGE SUBSTRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.
6. REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED SO AS NOT TO ALLOW DEBRIS TO FALL INTO THE WATER. THE CONTRACTOR SHALL REMOVE THE BRIDGE AND SUBMIT PLANS FOR DEMOLITION IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.
7. FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.
8. FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
9. FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
10. FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
11. FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.
12. FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.
13. ASPHALT WEARING SURFACE IS INCLUDED IN ROADWAY QUANTITY ON ROADWAY PLANS.
14. THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 25'± FT LEFT SIDE AND 55'± RIGHT SIDE OF CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS
15. THE EXISTING STRUCTURE #920077 CONSISTING OF EIGHT (8) TIMBER JOISTS SPANS @ 17'-6", 17'-6", 17'-0", 17'-0", 17'-0", 17'-0", 17'-3" & 17'-3" (137'-6" TOTAL LENGTH), 19'-2" CLEAR ROADWAY WIDTH AND TIMBER DECK WITH AN ASPHALT WEARING SURFACE ON TIMBER END BENTS & BENTS WITH TIMBER PILES ENCASED WITH CONCRETE NEAR THE WATER LINE AND LOCATED AT THE PROPOSED STRUCTURE SHALL BE REMOVED IN THEIR ENTIRETY. THE EXISTING BRIDGE IS PRESENTLY POSTED FOR A LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETERIORATE DURING CONSTRUCTION OF THE PROPOSED BRIDGE, A LOAD LIMIT MAY BE POSTED AND MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.
16. FOR ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION AND RENOVATION ACTIVITIES, SEE SPECIAL PROVISIONS.
17. NO HEAVY EQUIPMENT WILL BE PLACED IN FISHING CREEK.
18. BEST MANAGEMENT PRACTICES FOR BRIDGE DEMOLITION AND REMOVAL WILL BE IMPLEMENTED DURING THE REMOVAL OF THE EXISTING BRIDGE.

TOTAL BILL OF MATERIAL

	CONSTRUCTION MAINTENANCE & REMOVAL OF TEMPORARY ACCESS	REMOVAL OF EXISTING STRUCTURE	ASBESTOS ASSESSMENT	4'-0" DIA. DRILLED PIERS NOT IN SOIL	4'-0" DIA. DRILLED PIERS IN SOIL	PERMANENT STEEL CASING FOR 4'-0" Ø DRILLED PIER	SID INSPECTIONS	SPT TESTING	CSL TESTING	UNCLASSIFIED STRUCTURE EXCAVATION	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	PILE DRIVING EQUIPMENT SETUP FOR HP 12X53 STEEL PILES	PILE DRIVING EQUIPMENT SETUP FOR HP 14X73 GALVANIZED STEEL PILES	HP 12X53 STEEL PILES		HP 14X73 GALVANIZED STEEL PILES		VERTICAL CONCRETE BARRIER RAIL	RIP RAP CLASS II (2'-0" THICK)	ELASTOMERIC BEARINGS	GEOTEXTILE FOR DRAINAGE	3'-0" × 2'-0" PRESTRESSED CORED SLABS	
	LUMP SUM	LUMP SUM	LUMP SUM	LIN. FT.	LIN. FT.	LIN. FT.	EACH	EACH	EACH	LUMP SUM	CY	LUMP SUM	LBS	LBS	EACH	EACH	No.	LF	No.	LF	LF	TON	SY	LUMP SUM	No.	LF
SUPERSTRUCTURE												LUMP SUM									330.5			LUMP SUM	33	1815.00
END BENT No. 1										LUMP SUM	21.8		2,636		7		7	175				77	85			
BENT No. 1				25	85.1	92.1	1	1	1		24.3		13,778	4,107												
BENT No. 2											10.7		2,136			8			8	240						
END BENT No. 2										LUMP SUM	21.8		2,636		7		7	175				68	75			
TOTAL	LUMP SUM	LUMP SUM	LUMP SUM	25	85.1	92.1	1	1	1	LUMP SUM	78.6	LUMP SUM	21,186	4,107	14	8	14	350	8	240	330.5	145	160	LUMP SUM	33	1815.00

GENERAL NOTES (CONTINUED):

19. THE BRIDGE WILL BE REMOVED FROM THE TOP DOWN, FIRST REMOVING THE ASPHALT WITH CONTAINMENT MEASURES IN PLACE TO PREVENT COMPONENTS OF THE BRIDGE DECK FROM DROPPING INTO THE STREAM. THE METHOD OF CONTAINMENT WILL BE PROPOSED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER. THIS WILL BE FOLLOWED BY REMOVAL OF THE DECKING, GIRDERS, ETC., AND FINALLY THE WOODEN PILES. AN ATTEMPT WILL BE MADE TO COMPLETELY REMOVE THE EXISTING AND HISTORIC TIMBER PILES ALONG THE WATER'S EDGE (WITH CONCRETE ENCASEMENTS WHERE APPLICABLE) BEHIND AN IMPERVIOUS DIKE (THAT IS INCIDENTAL TO THE WORK). AN ATTEMPT WILL ALSO BE MADE TO COMPLETELY REMOVE THE INTERIOR EXISTING AND HISTORIC TIMBER PILES. IF THE REMOVAL OF THE TIMBER PILES CANNOT BE ACCOMPLISHED WITH MINIMAL SUBSTRATE DISTURBANCE, THE PILES WILL BE PINCHED OFF ONE FOOT BELOW THE MUD LINE OR CUT FLUSH WITH EXISTING MUD LINE AS DIRECTED BY THE ENGINEER. THE CONTRACTOR WILL NOT BE ALLOWED TO DRAG REMOVED TIMBER PILES ON OR ACROSS THE STREAM BED.
20. DECK DRAINS WILL NOT BE ALLOWED TO DISCHARGE DIRECTLY INTO THE STREAM.
21. AT THE CONTRACTOR'S OPTION, AND UPON REMOVAL OF THE CAUSEWAY, THE CLASS II RIP RAP USED IN THE CAUSEWAY MAY BE PLACED AS RIP RAP SLOPE PROTECTION. SEE SPECIAL PROVISIONS FOR CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY ACCESS AT STATION 15+02.50 -L-.
22. FOR REMOVAL OF EXISTING STRUCTURE AT STATION 15+02.50 -L-, SEE SPECIAL PROVISIONS.

HYDRAULIC DATA	
DESIGN DISCHARGE	9700 CFS
FREQUENCY OF DESIGN FLOOD	25 YR.
DESIGN HIGHWATER ELEV.	169.8 FT.
DRAINAGE AREA	118 SQ. MI.
BASE DISCHARGE (Q100)	15053 C.F.S
BASE HIGHWATER ELEV.	172.0 FT

OVERTOPPING FLOOD DATA	
OVERTOPPING DISCHARGE	8040 CFS
FREQUENCY OF OVERTOPPING FLOOD	10+ YR.
OVERTOPPING FLOOD ELEV.	*169.4 FT.

*OVERTOPPING AT SAG ±296 FT. PAST END OF PROJECT

DocuSigned by: David Ruggles C462768DF4124222... 7/17/2018

NORTH CAROLINA PROFESSIONAL SEAL 11725 ENGINEER DAVID R. RUGGLES

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DRAWN BY: E. PHELPS DATE: 2/18
CHECKED BY: J. LOFTUS DATE: 2/18
DESIGN ENGINEER OF RECORD: J. LOFTUS DATE: 2/18

PROJECT NO. 17BP.5.R.77
WARREN COUNTY
STATION: 15+02.50 -L-
SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING BRIDGE OVER FISHING CREEK ON SR 1640 (RICHARDSON RD) BETWEEN NC 58 AND NC 43

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-3
1			3			TOTAL SHEETS
2			4			22

WARREN 77
7/17/2018
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USER:default

LOAD AND RESISTANCE FACTOR RATING (LRFD) SUMMARY FOR PRESTRESSED CONCRETE GIRDERS

LEVEL		VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W X RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE						COMMENT NUMBER
								MOMENT					SHEAR					MOMENT						
							LIVELOAD FACTORS	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVELOAD FACTORS	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING		HL-93(Inv)	N/A	1	1.006	--	1.75	0.273	1.03	70'	EL	34.5	0.507	1.32	70'	EL	6.9	0.80	0.273	1.01	70'	EL	34.5	
		HL-93(Opr)	N/A	--	1.341	--	1.35	0.273	1.34	70'	EL	34.5	0.507	1.72	70'	EL	6.9	N/A	--	--	--	--	--	
		HS-20(Inv)	36.000	2	1.306	47.02	1.75	0.273	1.34	70'	EL	34.5	0.507	1.65	70'	EL	6.9	0.80	0.273	1.31	70'	EL	34.5	
		HS-20(Opr)	36.000	--	1.74	62.64	1.35	0.273	1.74	70'	EL	34.5	0.507	2.14	70'	EL	6.9	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SV	SNSH	13.500	--	2.917	39.379	1.4	0.273	3.75	70'	EL	34.5	0.507	4.87	70'	EL	6.9	0.80	0.273	2.92	70'	EL	34.5	
		SNGARBS2	20.000	--	2.187	43.741	1.4	0.273	2.81	70'	EL	34.5	0.507	3.47	70'	EL	6.9	0.80	0.273	2.19	70'	EL	34.5	
		SNAGRIS2	22.000	--	2.077	45.69	1.4	0.273	2.67	70'	EL	34.5	0.507	3.23	70'	EL	6.9	0.80	0.273	2.08	70'	EL	34.5	
		SNCOTTS3	27.250	--	1.452	39.565	1.4	0.273	1.87	70'	EL	34.5	0.507	2.43	70'	EL	6.9	0.80	0.273	1.45	70'	EL	34.5	
		SNAGGRS4	34.925	--	1.218	42.554	1.4	0.273	1.57	70'	EL	34.5	0.507	2.03	70'	EL	6.9	0.80	0.273	1.22	70'	EL	34.5	
		SNS5A	35.550	--	1.191	42.346	1.4	0.273	1.53	70'	EL	34.5	0.507	2.06	70'	EL	6.9	0.80	0.273	1.19	70'	EL	34.5	
		SNS6A	39.950	--	1.095	43.747	1.4	0.273	1.41	70'	EL	34.5	0.507	1.88	70'	EL	6.9	0.80	0.273	1.10	70'	EL	34.5	
		SNS7B	42.000	--	1.043	43.801	1.4	0.273	1.34	70'	EL	34.5	0.507	1.85	70'	EL	6.9	0.80	0.273	1.04	70'	EL	34.5	
	TTST	TNAGRIT3	33.000	--	1.336	44.087	1.4	0.273	1.72	70'	EL	34.5	0.507	2.23	70'	EL	6.9	0.80	0.273	1.34	70'	EL	34.5	
		TNT4A	33.075	--	1.342	44.401	1.4	0.273	1.72	70'	EL	34.5	0.507	2.17	70'	EL	6.9	0.80	0.273	1.34	70'	EL	34.5	
		TNT6A	41.600	--	1.1	45.746	1.4	0.273	1.41	70'	EL	34.5	0.507	1.98	70'	EL	6.9	0.80	0.273	1.10	70'	EL	34.5	
		TNT7A	42.000	--	1.106	46.462	1.4	0.273	1.42	70'	EL	34.5	0.507	1.94	70'	EL	6.9	0.80	0.273	1.11	70'	EL	34.5	
		TNT7B	42.000	--	1.147	48.18	1.4	0.273	1.47	70'	EL	34.5	0.507	1.8	70'	EL	6.9	0.80	0.273	1.15	70'	EL	34.5	
		TNAGRIT4	43.000	--	1.089	46.838	1.4	0.273	1.4	70'	EL	34.5	0.507	1.74	70'	EL	6.9	0.80	0.273	1.09	70'	EL	34.5	
		TNAGT5A	45.000	--	1.026	46.175	1.4	0.273	1.32	70'	EL	34.5	0.507	1.74	70'	EL	6.9	0.80	0.273	1.03	70'	EL	34.5	
		TNAGT5B	45.000	3	1.013	45.579	1.4	0.273	1.3	70'	EL	34.5	0.507	1.66	70'	EL	6.9	0.80	0.273	1.01	70'	EL	34.5	

LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	γ_{DC}	γ_{DW}
	STRENGTH I	1.25	1.50
	SERVICE III	1.00	1.00

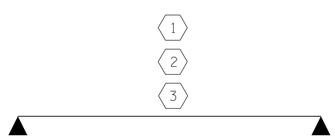
NOTES:

MINIMUM RATING FACTORS ARE BASED ON THE STRENGTH I AND SERVICE III LIMIT STATES.

ALLOWABLE STRESSES FOR SERVICE III LIMIT STATE ARE AS REQUIRED FOR DESIGN.

⟨#⟩ CONTROLLING LOAD RATING
⟨1⟩ DESIGN LOAD RATING (HL-93)
⟨2⟩ DESIGN LOAD RATING (HS-20)
⟨3⟩ LEGAL LOAD RATING **
** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION
I - INTERIOR GIRDER
EL - EXTERIOR LEFT GIRDER
ER - EXTERIOR RIGHT GIRDER



LRFR SUMMARY

FOR SPAN 'A' AND SPAN 'B'

DocuSigned by: David Ruggles C46276B0F4124222...
7/17/2018

NORTH CAROLINA PROFESSIONAL SEAL 11725 ENGINEER DAVID R RUGGLES

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STEWART

PROJECT NO. 17BP.5.R.77

WARREN COUNTY

STATION: 15+02.50 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

LRFR SUMMARY FOR 70' CORED SLAB UNIT 90° SKEW

(NON-INTERSTATE TRAFFIC)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-4
1			3			TOTAL SHEETS
2			4			22

DRAWN BY:	E. PHELPS	DATE : 2/18
CHECKED BY:	J. LOFTUS	DATE : 2/18
DESIGN ENGINEER OF RECORD:	J. LOFTUS	DATE : 2/18

6/29/2018
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USER:ephelps

WARREN 77

STD. NO. 39LRFR1_90S_100L

LOAD AND RESISTANCE FACTOR RATING (LRFD) SUMMARY FOR PRESTRESSED CONCRETE GIRDERS

LEVEL		VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W X RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE						COMMENT NUMBER
								MOMENT					SHEAR					MOMENT						
							LIVELOAD FACTORS	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVELOAD FACTORS	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING		HL-93(Inv)	N/A	1	2.42	--	1.75	0.370	2.42	25'	EL	12.5	0.400	2.98	25'	EL	22.2	0.80	0.370	3.30	25'	EL	12.5	
		HL-93(Opr)	N/A	--	3.14	--	1.35	0.370	3.14	25'	EL	12.5	0.400	3.86	25'	EL	22.2	N/A	--	--	--	--	--	
		HS-20(Inv)	36.000	2	3.62	130.32	1.75	0.370	3.62	25'	EL	9.5	0.400	3.44	25'	EL	22.2	0.80	0.370	4.94	25'	EL	9.5	
		HS-20(Opr)	36.000	--	4.70	169.20	1.35	0.370	4.70	25'	EL	9.5	0.400	4.46	25'	EL	22.2	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SV	SNSH	13.500	--	6.69	90.31	1.4	0.370	6.69	25'	EL	12.5	0.400	7.94	25'	EL	22.2	0.80	0.370	7.29	25'	EL	9.5	
		SNGARBS2	20.000	--	6.26	125.20	1.4	0.370	6.26	25'	EL	12.5	0.400	6.38	25'	EL	22.2	0.80	0.370	6.82	25'	EL	12.5	
		SNAGRIS2	22.000	--	6.59	131.80	1.4	0.370	6.59	25'	EL	9.5	0.400	6.25	25'	EL	22.2	0.80	0.370	7.19	25'	EL	9.5	
		SNCOTTS3	27.250	--	3.43	93.47	1.4	0.370	3.43	25'	EL	12.5	0.400	4.01	25'	EL	22.2	0.80	0.370	3.74	25'	EL	12.5	
		SNAGGRS4	34.925	--	3.43	119.79	1.4	0.370	3.43	25'	EL	12.5	0.400	3.89	25'	EL	22.2	0.80	0.370	3.73	25'	EL	12.5	
		SNS5A	35.550	--	3.29	116.96	1.4	0.370	3.29	25'	EL	12.5	0.400	4.06	25'	EL	22.2	0.80	0.370	3.59	25'	EL	12.5	
		SNS6A	39.950	--	3.09	123.44	1.4	0.370	3.09	25'	EL	12.5	0.400	3.90	25'	EL	22.2	0.80	0.370	3.37	25'	EL	12.5	
		SNS7B	42.000	3	3.05	128.10	1.4	0.370	3.05	25'	EL	12.5	0.400	3.93	25'	EL	22.2	0.80	0.370	3.33	25'	EL	12.5	
	TTST	TNAGRIT3	33.000	--	4.30	141.90	1.4	0.370	4.30	25'	EL	12.5	0.400	4.79	25'	EL	22.2	0.80	0.370	4.68	25'	EL	12.5	
		TNT4A	33.075	--	3.78	125.02	1.4	0.370	3.78	25'	EL	12.5	0.400	4.35	25'	EL	22.2	0.80	0.370	4.12	25'	EL	12.5	
		TNT6A	41.600	--	3.55	147.68	1.4	0.370	3.55	25'	EL	12.5	0.400	4.08	25'	EL	22.2	0.80	0.370	3.86	25'	EL	12.5	
		TNT7A	42.000	--	3.66	153.72	1.4	0.370	3.66	25'	EL	12.5	0.400	4.07	25'	EL	22.2	0.80	0.370	3.99	25'	EL	12.5	
		TNT7B	42.000	--	3.32	139.44	1.4	0.370	3.32	25'	EL	9.5	0.400	3.92	25'	EL	22.2	0.80	0.370	3.62	25'	EL	12.5	
		TNAGRIT4	43.000	--	3.53	151.79	1.4	0.370	3.53	25'	EL	12.5	0.400	3.94	25'	EL	22.2	0.80	0.370	3.85	25'	EL	12.5	
		TNAGT5A	45.000	--	3.53	158.85	1.4	0.370	3.53	25'	EL	12.5	0.400	3.99	25'	EL	22.2	0.80	0.370	3.85	25'	EL	12.5	
		TNAGT5B	45.000	--	3.43	154.35	1.4	0.370	3.43	25'	EL	9.5	0.400	3.63	25'	EL	22.2	0.80	0.370	3.75	25'	EL	9.5	

LOAD FACTORS:

	LIMIT STATE	γ_{DC}	γ_{DW}
DESIGN LOAD RATING FACTORS	STRENGTH I	1.25	1.50
	SERVICE III	1.00	1.00

NOTES:

MINIMUM RATING FACTORS ARE BASED ON THE STRENGTH I AND SERVICE III LIMIT STATES.

ALLOWABLE STRESSES FOR SERVICE III LIMIT STATE ARE AS REQUIRED FOR DESIGN.

⟨#⟩ CONTROLLING LOAD RATING

⟨1⟩ DESIGN LOAD RATING (HL-93)

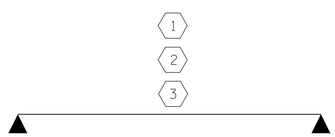
⟨2⟩ DESIGN LOAD RATING (HS-20)

⟨3⟩ LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

I - INTERIOR GIRDER
EL - EXTERIOR LEFT GIRDER
ER - EXTERIOR RIGHT GIRDER



LRFR SUMMARY

FOR SPAN 'C'

DocuSigned by: David Ruggles C46276B0F4124222... 7/17/2018

NORTH CAROLINA PROFESSIONAL SEAL 11725 ENGINEER DAVID R. RUGGLES

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STEWART

PROJECT NO. 17BP.5.R.77

WARREN COUNTY

STATION: 15+02.50 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

LRFR SUMMARY FOR 25' CORED SLAB UNIT 90° SKEW

(NON-INTERSTATE TRAFFIC)

REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. S-5

TOTAL SHEETS 22

DRAWN BY: E. PHELPS DATE : 2/18
CHECKED BY: J. LOFTUS DATE : 2/18
DESIGN ENGINEER OF RECORD: J. LOFTUS DATE : 2/18

6/29/2018
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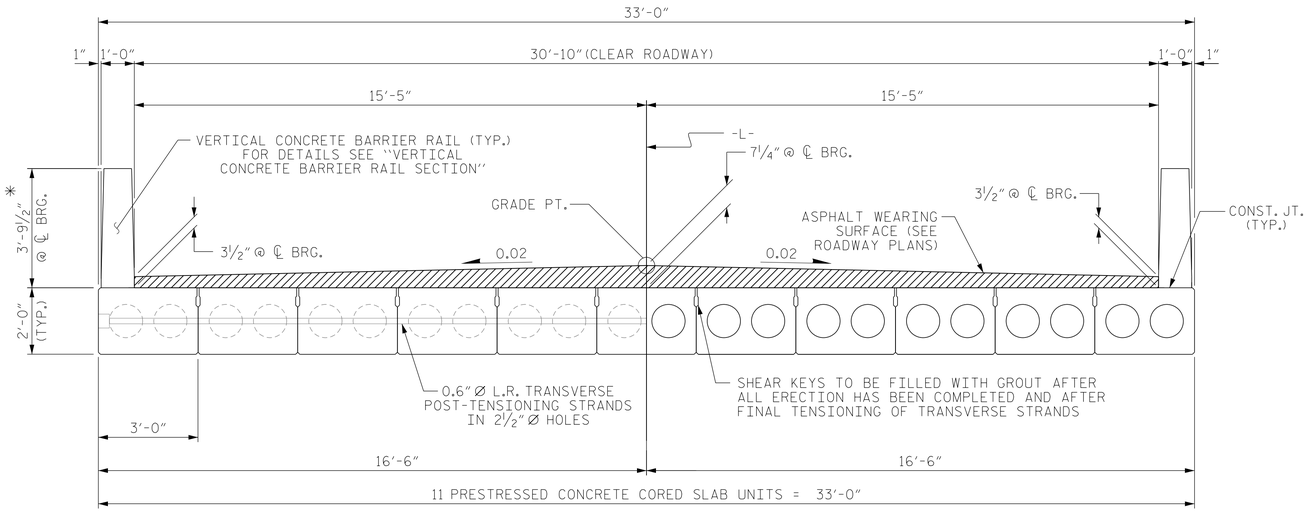
USER:ephelps

WARREN 77

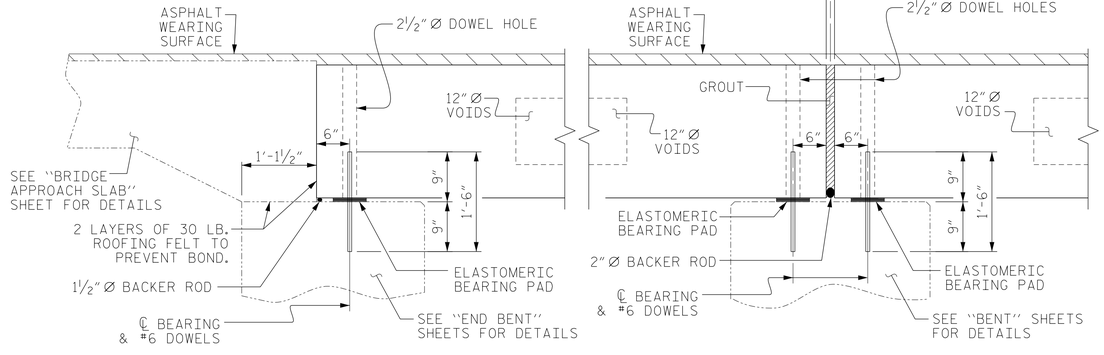


HALF SECTION
AT INTERMEDIATE DIAPHRAGMS

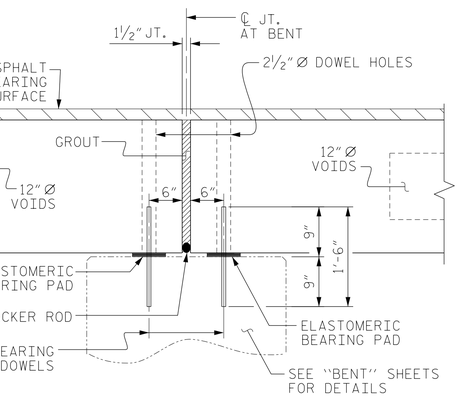
HALF SECTION
THROUGH VOIDS

TYPICAL SECTION

* - THE MAXIMUM BARRIER RAIL HEIGHT AND ASPHALT THICKNESS IS SHOWN. THE HEIGHT OF THE BARRIER RAIL AND ASPHALT THICKNESS VARIES WHILE THE TOP OF THE BARRIER RAIL FOLLOWS THE PROFILE OF THE GUTTERLINE. FOR RAIL HEIGHT DETAILS AND ASPHALT THICKNESS, SEE THE "VERTICAL CONCRETE BARRIER RAIL SECTION" DETAIL.



SECTION AT END BENT



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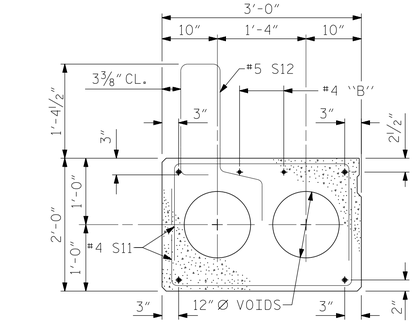
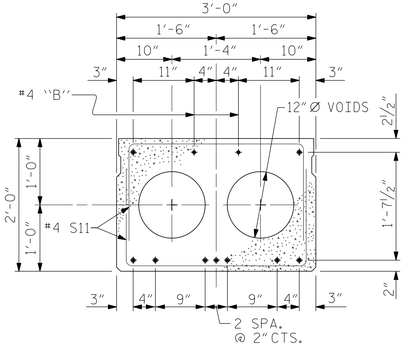


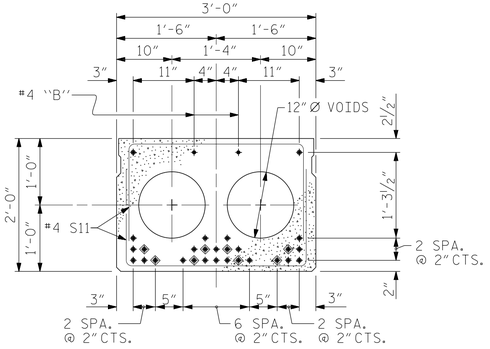
EXTERIOR SLAB SECTION

(FOR PRESTRESSED STRAND LAYOUT, SEE INTERIOR SLAB SECTION.)



INTERIOR SLAB SECTION (25' UNIT)

(9 STRANDS REQUIRED)



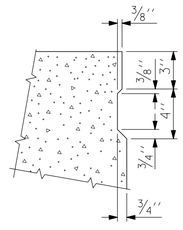
INTERIOR SLAB SECTION (70' UNIT)

(28 STRANDS REQUIRED)

0.6" Ø LOW RELAXATION STRAND LAYOUT

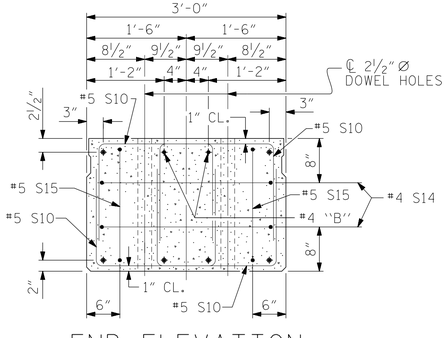
◈ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 12'-0" FROM END OF CORED SLAB UNIT. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

DEBONDING LEGEND



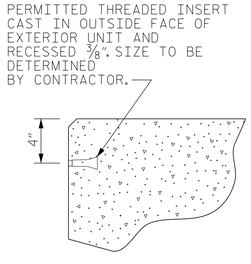
SHEAR KEY DETAIL

NOTE: OMIT SHEAR KEY ON OUTSIDE FACE OF EXTERIOR CORED SLABS.

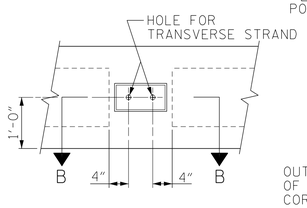


END ELEVATION

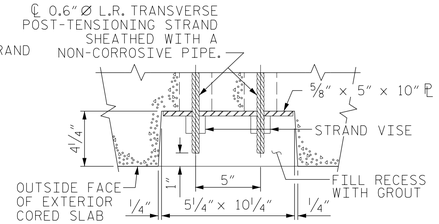
SHOWING PLACEMENT OF DOUBLE STIRRUPS AND LOCATION OF DOWEL HOLES. (STRAND LAYOUT NOT SHOWN.) INTERIOR SLAB UNIT SHOWN-EXTERIOR SLAB UNIT SIMILAR EXCEPT SHEAR KEY LOCATION.



THREADED INSERT DETAIL



ELEVATION VIEW



SECTION B-B

GROUTED RECESS AT END OF POST-TENSIONED STRAND CORED SLABS

PROJECT NO. 17BP.5.R.77

WARREN COUNTY

STATION: 15+02.50 -L-

SHEET 1 OF 6

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7/17/2018

NORTH CAROLINA PROFESSIONAL SEAL 11725 ENGINEER DAVID R RUGGLES

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

3'-0" X 2'-0" PRESTRESSED CONCRETE CORED SLAB UNIT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			22

DRAWN BY:	E. PHELPS	DATE : 2/18
CHECKED BY:	J. LOFTUS	DATE : 2/18
DESIGN ENGINEER OF RECORD:	J. LOFTUS	DATE : 2/18

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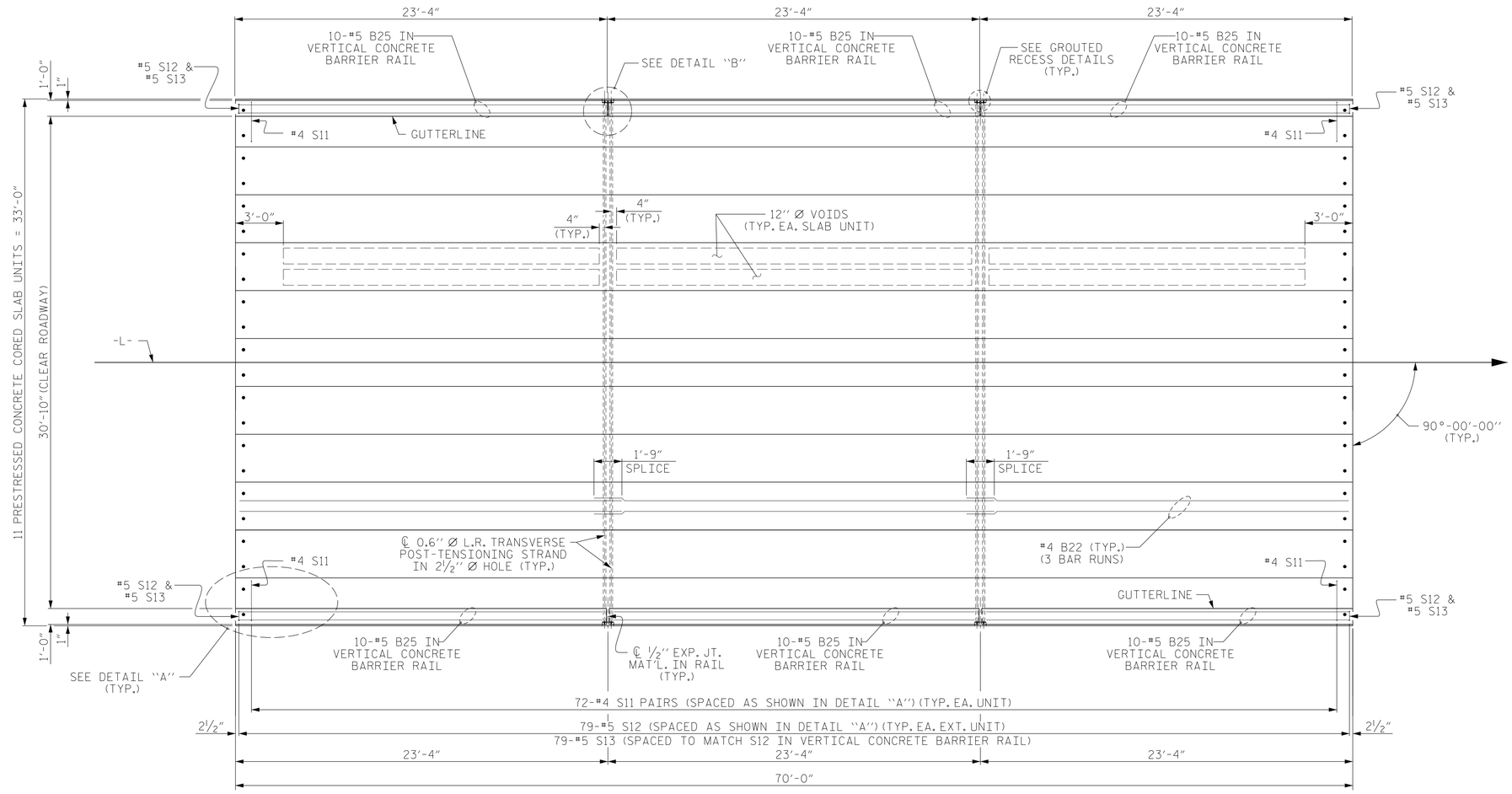
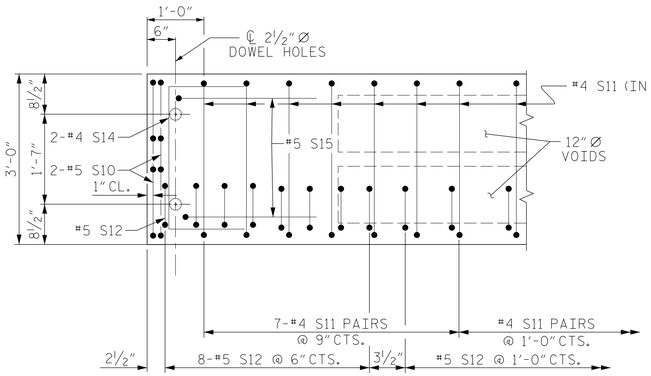
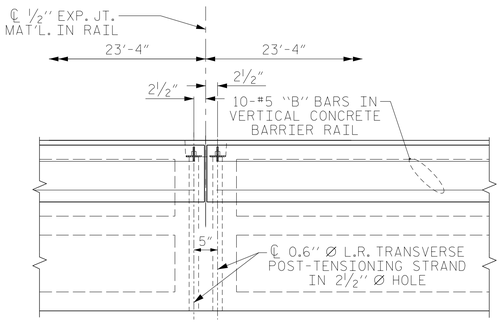


PLAN OF SPAN A



DETAIL "A"

(TYPICAL EACH END OF UNIT)
NOTE: EXTERIOR UNIT SHOWN - INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S12 BARS.



DETAIL "B"

#4 S11 BARS MAY BE SHIFTED AS NECESSARY TO MAINTAIN 1" CLEAR TO GROUTED RECESS AND 2½" Ø TRANSVERSE POST-TENSIONING STRAND HOLES

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NORTH CAROLINA PROFESSIONAL SEAL 11725 ENGINEER DAVID R. RUGGLES

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PROJECT NO. 17BP.5.R.77

WARREN COUNTY

STATION: 15+02.50 -L-

SHEET 2 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SPAN A
PLAN OF 70' UNIT
30'-10" CLEAR ROADWAY
90° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-7
1			3			TOTAL SHEETS
2			4			22

DRAWN BY:	E. PHELPS	DATE : 2/18
CHECKED BY:	J. LOFTUS	DATE : 2/18
DESIGN ENGINEER OF RECORD:	J. LOFTUS	DATE : 2/18

6/29/2018
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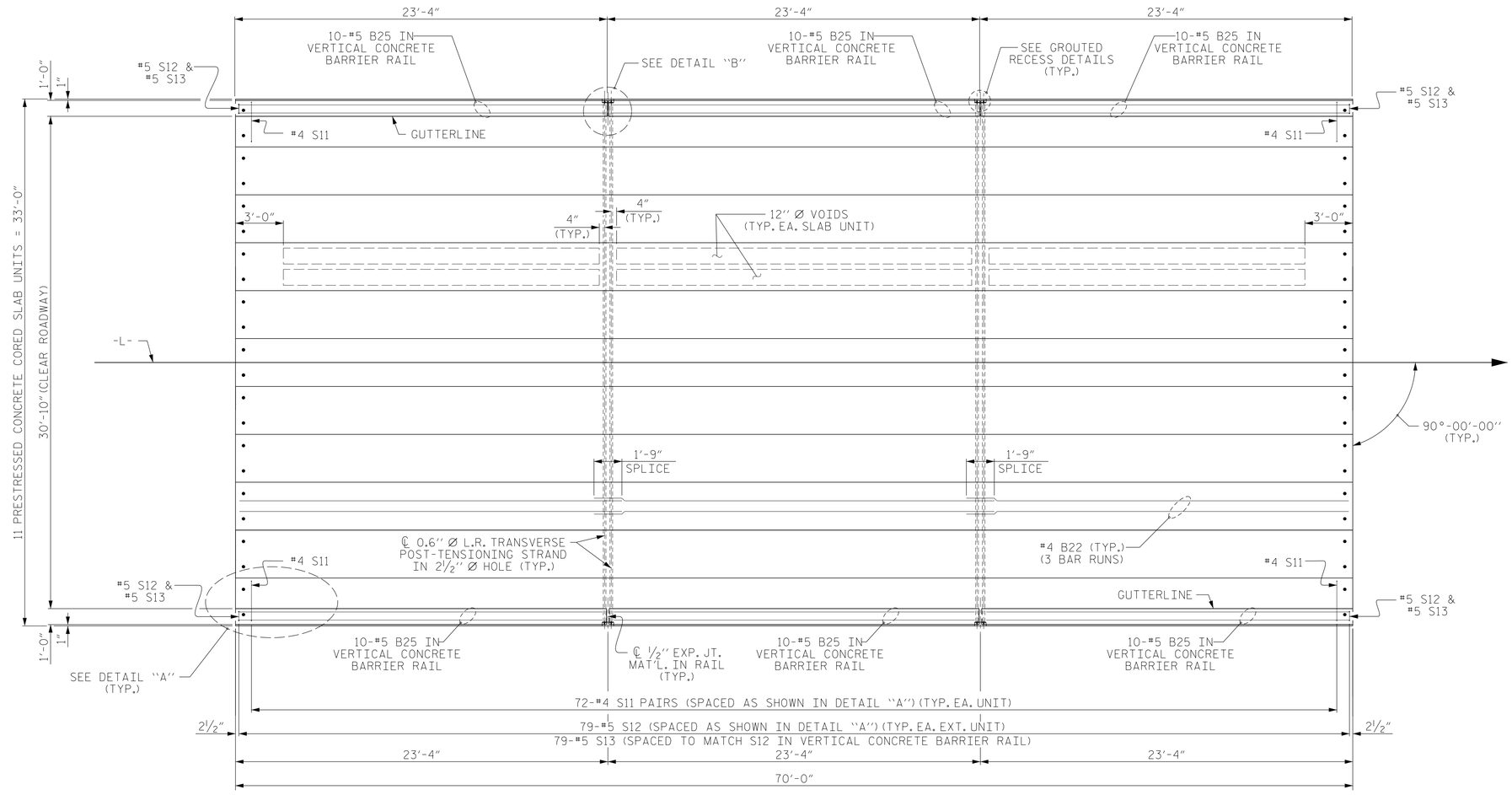
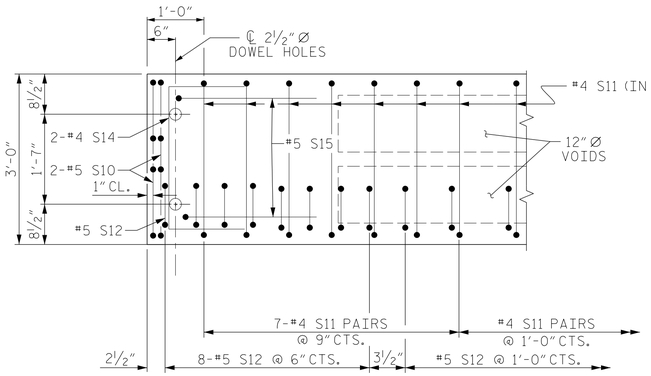
USER:ephelps
WARREN 77

STD. NO. 24PCS_33_90S_70L

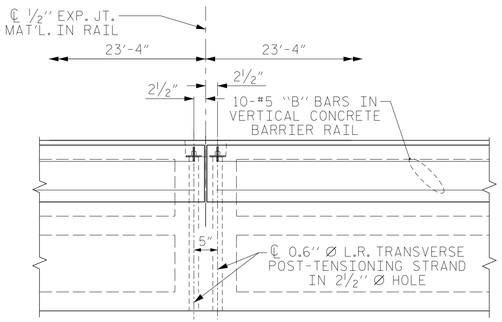


PLAN OF SPAN B



DETAIL "A"

(TYPICAL EACH END OF UNIT)
NOTE: EXTERIOR UNIT SHOWN - INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S12 BARS.



DETAIL "B"

#4 S11 BARS MAY BE SHIFTED AS NECESSARY TO MAINTAIN 1" CLEAR TO GROUTED RECESS AND 2½" Ø TRANSVERSE POST-TENSIONING STRAND HOLES

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PROJECT NO. 17BP.5.R.77

WARREN COUNTY

STATION: 15+02.50 -L-

SHEET 3 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SPAN B
PLAN OF 70' UNIT
30'-10" CLEAR ROADWAY
90° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-8
1			3			TOTAL SHEETS
2			4			22

DRAWN BY:	E. PHELPS	DATE : 2/18
CHECKED BY:	J. LOFTUS	DATE : 2/18
DESIGN ENGINEER OF RECORD:	J. LOFTUS	DATE : 2/18

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6/29/2018
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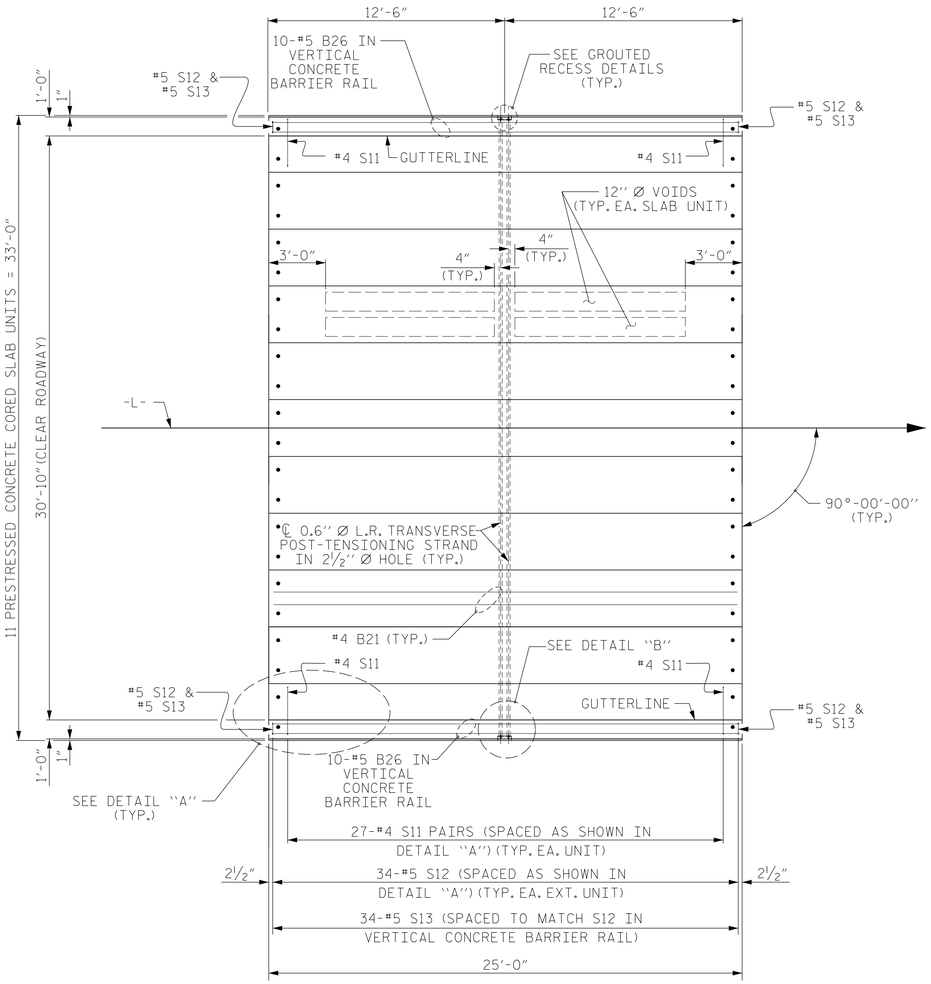
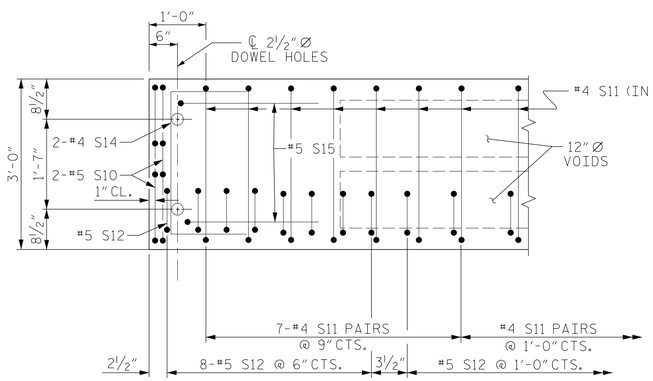
STD. NO. 24PCS_33_90S_70L

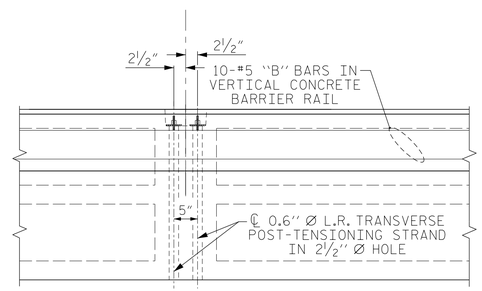


PLAN OF SPAN C



DETAIL "A"

(TYPICAL EACH END OF UNIT)
NOTE: EXTERIOR UNIT SHOWN - INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S12 BARS.



DETAIL "B"

#4 S11 BARS MAY BE SHIFTED AS NECESSARY TO MAINTAIN 1" CLEAR TO GROUTED RECESS AND 2½" Ø TRANSVERSE POST-TENSIONING STRAND HOLES

DRAWN BY:	E. PHELPS	DATE :	2/18
CHECKED BY:	J. LOFTUS	DATE :	2/18
DESIGN ENGINEER OF RECORD:	J. LOFTUS	DATE :	2/18

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7/17/2018

NORTH CAROLINA PROFESSIONAL SEAL 11725 ENGINEER DAVID R. RUGGLES

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WARREN COUNTY
STATION: 15+02.50 -L-
SHEET 4 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SPAN C
PLAN OF 25' UNIT
30'-10" CLEAR ROADWAY
90° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-9
1			3			TOTAL SHEETS
2			4			22

WARREN 77
6/29/2018
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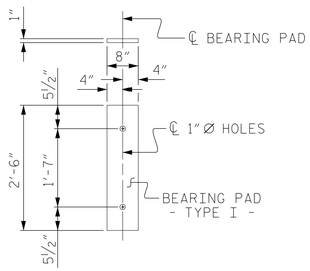


FIXED END
(TYPE I - 66 REQ'D)

ELASTOMERIC BEARING DETAILS

ELASTOMER IN ALL BEARINGS SHALL BE 60 DUROMETER HARDNESS.

DEAD LOAD DEFLECTION AND CAMBER	
	3'-0" x 2'-0"
25' CORED SLAB UNIT	0.6"Ø L.R. STRAND
CAMBER (SLAB ALONE IN PLACE)	¼" ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD**	0" ↓
FINAL CAMBER	¼" ↑

** INCLUDES FUTURE WEARING SURFACE

DEAD LOAD DEFLECTION AND CAMBER	
	3'-0" x 2'-0"
70' CORED SLAB UNIT	0.6"Ø L.R. STRAND
CAMBER (SLAB ALONE IN PLACE)	2¼" ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD**	¾" ↓
FINAL CAMBER	1½" ↑

** INCLUDES FUTURE WEARING SURFACE

BILL OF MATERIAL FOR ONE 25' CORED SLAB UNIT

				EXTERIOR UNIT		INTERIOR UNIT	
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	LENGTH	WEIGHT
B21	2	#4	STR	24'-8"	33	24'-8"	33
S10	8	#5	3	4'-9"	40	4'-9"	40
S11	54	#4	3	5'-10"	210	5'-10"	210
*S12	34	#5	1	5'-7"	198		
S14	4	#4	3	5'-7"	15	5'-7"	15
S15	4	#5	3	7'-1"	30	7'-1"	30
REINFORCING STEEL			LBS.		328		328
*EPOXY COATED REINFORCING STEEL			LBS.		198		
7000 P.S.I. CONCRETE			CU. YDS.		4.5		4.5
0.6"Ø L.R. STRANDS			No.		9		9

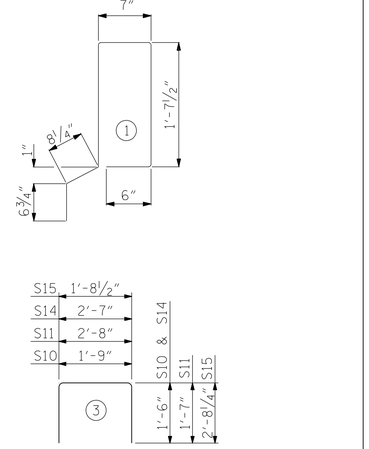
BILL OF MATERIAL FOR ONE 70' CORED SLAB UNIT

				EXTERIOR UNIT		INTERIOR UNIT	
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	LENGTH	WEIGHT
B22	6	#4	STR	24'-6"	98	24'-6"	98
S10	8	#5	3	4'-9"	40	4'-9"	40
S11	144	#4	3	5'-10"	561	5'-10"	561
*S12	79	#5	1	5'-7"	460		
S14	4	#4	3	5'-7"	15	5'-7"	15
S15	4	#5	3	7'-1"	30	7'-1"	30
REINFORCING STEEL			LBS.		744		744
*EPOXY COATED REINFORCING STEEL			LBS.		460		
7000 P.S.I. CONCRETE			CU. YDS.		11.8		11.8
0.6"Ø L.R. STRANDS			No.		28		28

CONCRETE RELEASE STRENGTH	
UNIT	PSI
25' UNITS	5500
70' UNITS	5500

GRADE 270 STRANDS	
	0.6"Ø L.R.
AREA (SQUARE INCHES)	0.217
ULTIMATE STRENGTH (LBS. PER STRAND)	58,600
APPLIED PRESTRESS (LBS. PER STRAND)	43,950

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

CORED SLABS REQUIRED

	NUMBER	LENGTH	TOTAL LENGTH
25' UNIT			
EXTERIOR C.S.	2	25'-0"	50'-0"
INTERIOR C.S.	9	25'-0"	225'-0"
TOTAL	11	-	275'-0"

CORED SLABS REQUIRED

	NUMBER	LENGTH	TOTAL LENGTH
70' UNIT			
EXTERIOR C.S.	4	70'-0"	280'-0"
INTERIOR C.S.	18	70'-0"	1260'-0"
TOTAL	22	-	1540'-0"

NOTES

ALL PRESTRESSING STRANDS SHALL BE 7-WIRE LOW RELAXATION GRADE 270 STRANDS AND SHALL CONFORM TO AASHTO M203 EXCEPT FOR SAMPLING REQUIREMENTS WHICH SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ALL REINFORCING STEEL CAST WITH THE CORED SLAB SECTIONS SHALL BE GRADE 60 AND SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE CORED SLABS.

RECESSES FOR TRANSVERSE STRANDS SHALL BE GROUTED AFTER THE TENSIONING OF THE STRANDS.

THE 2½"Ø DOWEL HOLES AT FIXED ENDS OF SLAB SECTIONS SHALL BE FILLED WITH NON-SHRINK GROUT.

THE BACKER RODS SHALL CONFORM TO THE REQUIREMENTS OF TYPE M BOND BREAKER. SEE SECTION 1028 OF THE STANDARD SPECIFICATIONS.

WHEN CORED SLABS ARE CAST, AN INTERNAL HOLD-DOWN SYSTEM SHALL BE EMPLOYED TO PREVENT VOIDS FROM RISING OR MOVING SIDEWAYS. AT LEAST SIX WEEKS PRIOR TO CASTING CORED SLABS, THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER FOR REVIEW AND COMMENT, DETAILED DRAWINGS OF THE PROPOSED HOLD-DOWN SYSTEM. IN ADDITION TO STRUCTURAL DETAILS, LOCATION AND SPACING OF THE HOLD-DOWNS SHALL BE INDICATED.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE CORED SLAB UNIT SHALL BE DONE WHEN THE CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN THE REQUIRED STRENGTH SHOWN IN THE "CONCRETE RELEASE STRENGTH" TABLE.

ALL REINFORCING STEEL IN VERTICAL CONCRETE BARRIER RAILS SHALL BE EPOXY COATED.

PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE CORED SLAB UNIT ENDS.

APPLY EPOXY PROTECTIVE COATING TO CORED SLAB UNIT ENDS.

GROOVED CONTRACTION JOINTS, ½" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF BARRIER RAIL SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

FLAME CUTTING OF THE TRANSVERSE POST-TENSIONING STRAND IS NOT ALLOWED.

MAINTAIN A SYMMETRIC TENSION FORCE BETWEEN EACH PAIR OF TRANSVERSE POST TENSIONING STRANDS IN THE DIAPHRAGM.

THE #4 S11 STIRRUPS MAY BE SHIFTED AS NECESSARY TO MAINTAIN 1" CLEAR TO THE GROUTED RECESS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

THE PERMITTED THREADED INSERTS ARE DETAILED AS AN OPTION FOR THE CONTRACTOR TO ATTACH FALSEWORK AND FORMWORK DURING CONSTRUCTION.

THE PERMITTED THREADED INSERTS IN THE EXTERIOR UNITS SHALL BE SIZED BY THE CONTRACTOR, SPACED AT 4'-0" CENTERS AND GALVANIZED IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS. STAINLESS STEEL THREADED INSERTS MAY BE USED AS AN ALTERNATE.

THE PERMITTED THREADED INSERTS SHALL BE GROUTED BY THE CONTRACTOR IMMEDIATELY FOLLOWING REMOVAL OF THE FALSEWORK.

THE COST OF THE PERMITTED THREADED INSERTS SHALL BE INCLUDED IN THE PRICE BID FOR THE PRECAST UNITS.

PROJECT NO. 17BP.5.R.77

WARREN COUNTY

STATION: 15+02.50 -L-

SHEET 5 OF 6

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STANDARD

3'-0" X 2'-0" PRESTRESSED CONCRETE CORED SLAB UNIT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS
2			4			22

DRAWN BY:	E. PHELPS	DATE : 2/18
CHECKED BY:	J. LOFTUS	DATE : 2/18
DESIGN ENGINEER OF RECORD:	J. LOFTUS	DATE : 2/18

WARREN 77

6/29/2018
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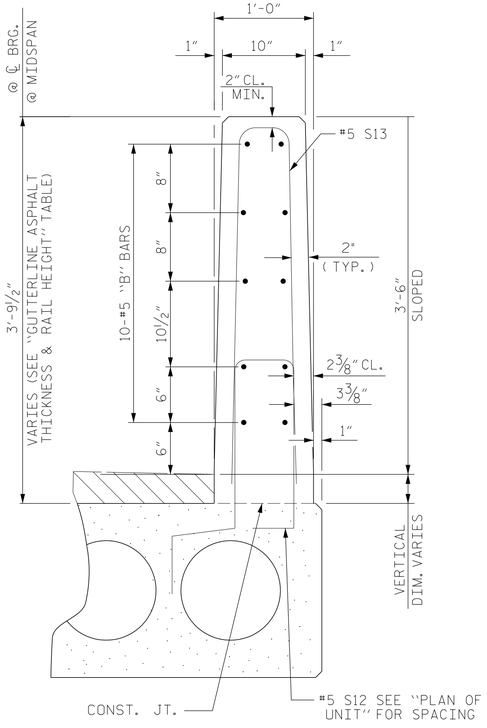
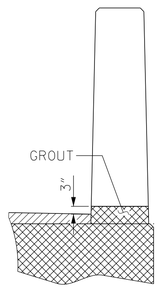
USER:ephelps

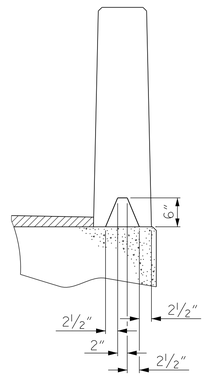
STD. NO. 24PCS3_33_90S



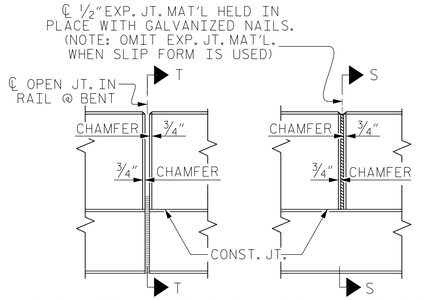
SECTION THRU RAIL



SECTION T-T
AT OPEN JOINT AT BENT
(THIS IS TO BE USED WHERE FOAM JOINT IS NOT USED)

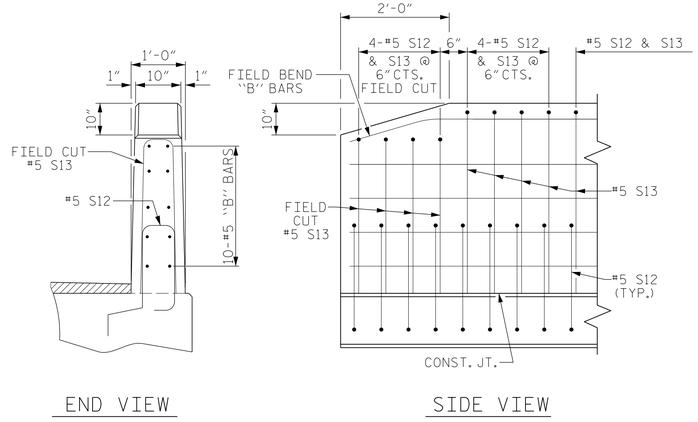


SECTION S-S
AT DAM IN OPEN JOINT
(THIS IS TO BE USED ONLY WHEN SLIP FORM IS USED)



ELEVATION AT EXPANSION JOINTS

VERTICAL CONCRETE BARRIER RAIL DETAILS



END VIEW

SIDE VIEW

END OF RAIL DETAILS

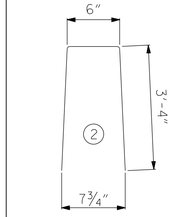
NOTES

ALL REINFORCING STEEL IN VERTICAL CONCRETE BARRIER RAILS SHALL BE EPOXY COATED.

GROOVED CONTRACTION JOINTS, ½" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF BARRIER RAIL SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

GUTTERLINE ASPHALT THICKNESS & RAIL HEIGHT		
	ASPHALT OVERLAY THICKNESS @ MID-SPAN	RAIL HEIGHT @ MID-SPAN
25' UNITS	3¼"	3'-9¼"
70' UNITS	2"	3'-8"

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL FOR VERTICAL CONCRETE BARRIER RAIL						
BAR	BARS PER PAIR OF EXTERIOR UNITS	TOTAL NO.	SIZE	TYPE	LENGTH	WEIGHT
	25' UNIT					
✳B26	20	20	#5	STR	24'-8"	515
✳S13	68	68	#5	2	7'-2"	508
✳EPOXY COATED REINFORCING STEEL				LBS.		1023
CLASS AA CONCRETE				CU.YDS.		6.7
TOTAL VERTICAL CONCRETE BARRIER RAIL				LN. FT.		50.125

BILL OF MATERIAL FOR VERTICAL CONCRETE BARRIER RAIL						
BAR	BARS PER PAIR OF EXTERIOR UNITS	TOTAL NO.	SIZE	TYPE	LENGTH	WEIGHT
	70' UNIT					
✳B25	60	120	#5	STR	22'-11"	2868
✳S13	158	316	#5	2	7'-2"	2362
✳EPOXY COATED REINFORCING STEEL				LBS.		5230
CLASS AA CONCRETE				CU.YDS.		36.2
TOTAL VERTICAL CONCRETE BARRIER RAIL				LN. FT.		280.375

PROJECT NO. 17BP.5.R.77

WARREN COUNTY

STATION: 15+02.50 -L-

SHEET 6 OF 6

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VERTICAL CONCRETE BARRIER RAIL DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
1			3			TOTAL SHEETS
2			4			22

DRAWN BY:	E. PHELPS	DATE : 2/18
CHECKED BY:	J. LOFTUS	DATE : 2/18
DESIGN ENGINEER OF RECORD:	J. LOFTUS	DATE : 2/18

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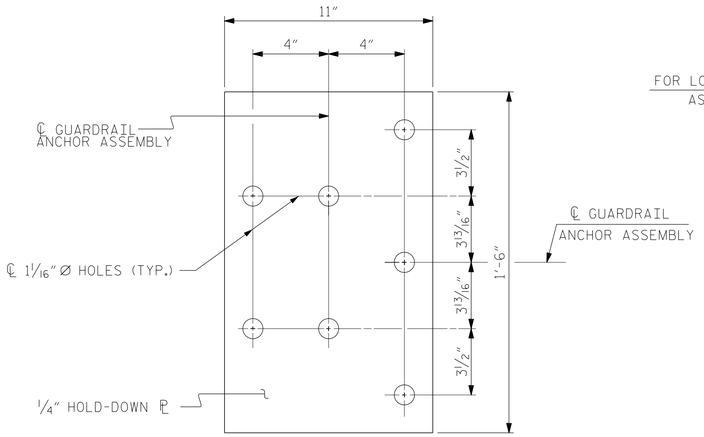
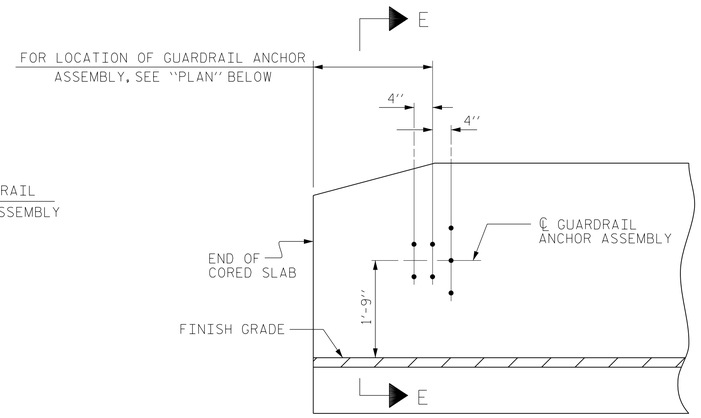


PLAN



ELEVATION

NOTES

THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A 1/4" HOLD DOWN PLATE AND 7 - 7/8" Ø BOLTS WITH NUTS AND WASHERS.

THE HOLD-DOWN PLATE SHALL CONFORM TO AASHTO M270 GRADE 36. AFTER FABRICATION, THE HOLD-DOWN PLATE SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH AASHTO M111.

BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 7/8" Ø GALVANIZED BOLTS, NUTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)

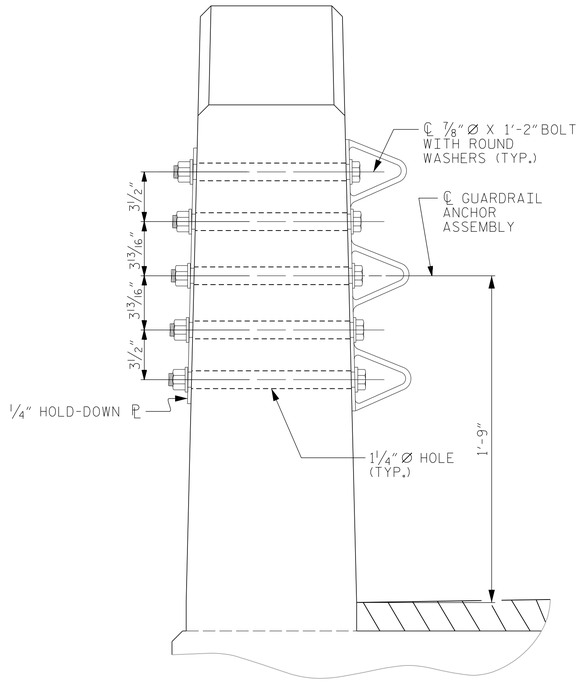
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

AFTER INSTALLATION, THE EXPOSED THREAD OF THE BOLT SHALL BE BURRED WITH A SHARP POINTED TOOL.

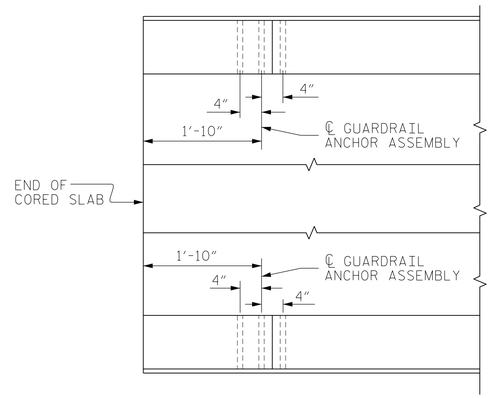
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR VERTICAL CONCRETE BARRIER RAIL.

THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE VERTICAL CONCRETE BARRIER RAIL TO CLEAR ASSEMBLY BOLTS.

THE 1 1/4" Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.



SECTION E-E



PLAN

LOCATION OF ANCHORS FOR GUARDRAIL

END BENT #1 SHOWN, END BENT #2 SIMILAR.

SKETCH SHOWING POINTS OF ATTACHMENT

✳ DENOTES GUARDRAIL ANCHOR ASSEMBLY

GUARDRAIL ANCHOR ASSEMBLY DETAILS

PROJECT NO. 17BP.5.R.77

WARREN COUNTY

STATION: 15+02.50 -L-

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STANDARD
GUARDRAIL ANCHORAGE DETAILS
FOR VERTICAL CONCRETE BARRIER RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-12
1			3			TOTAL SHEETS
2			4			22

DRAWN BY: E. PHELPS DATE: 2/18
CHECKED BY: J. LOFTUS DATE: 2/18
DESIGN ENGINEER OF RECORD: J. LOFTUS DATE: 2/18

(SHT 1b) STD. NO. GRA3

7/17/2018
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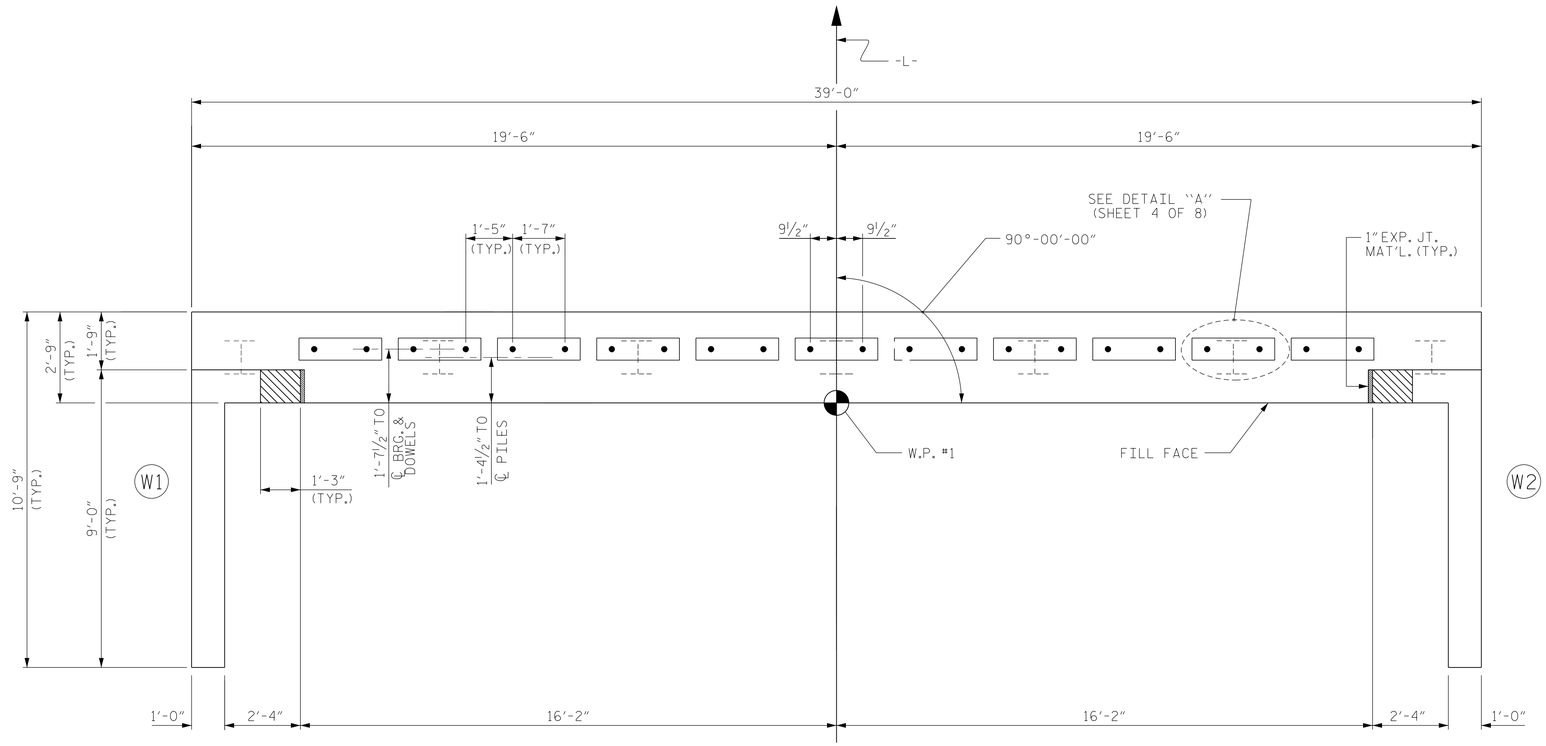
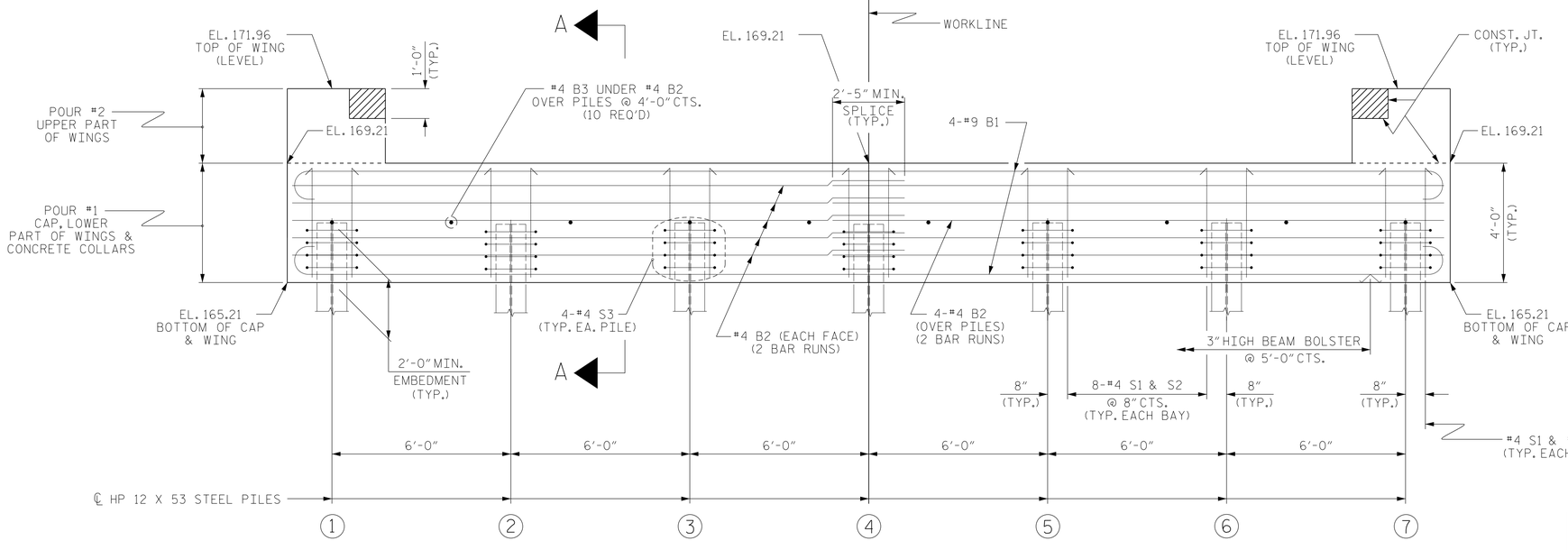
WARREN 77



PLAN



ELEVATION

WINGS NOT SHOWN FOR CLARITY.
FOR SECTION A-A, SEE SHEET 4 OF 8.
CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY.
SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 4 OF 8.

NOTES

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE VERTICAL CONCRETE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 8.

FOR WING DETAILS, SEE SHEET 3 OF 8.

NORTH CAROLINA PROFESSIONAL SEAL 11725 ENGINEER DAVID R. RUGGLES
Designed by: D. Ruggles C46270
7/17/2018

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WARREN COUNTY

STATION: 15+02.50 -L-

SHEET 1 OF 8

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
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SUBSTRUCTURE

END BENT No. 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS
2			4			22

DRAWN BY:	E. PHELPS	DATE : 2/18
CHECKED BY:	J. LOFTUS	DATE : 2/18
DESIGN ENGINEER OF RECORD:	J. LOFTUS	DATE : 2/18

WARREN 77
6/29/2018
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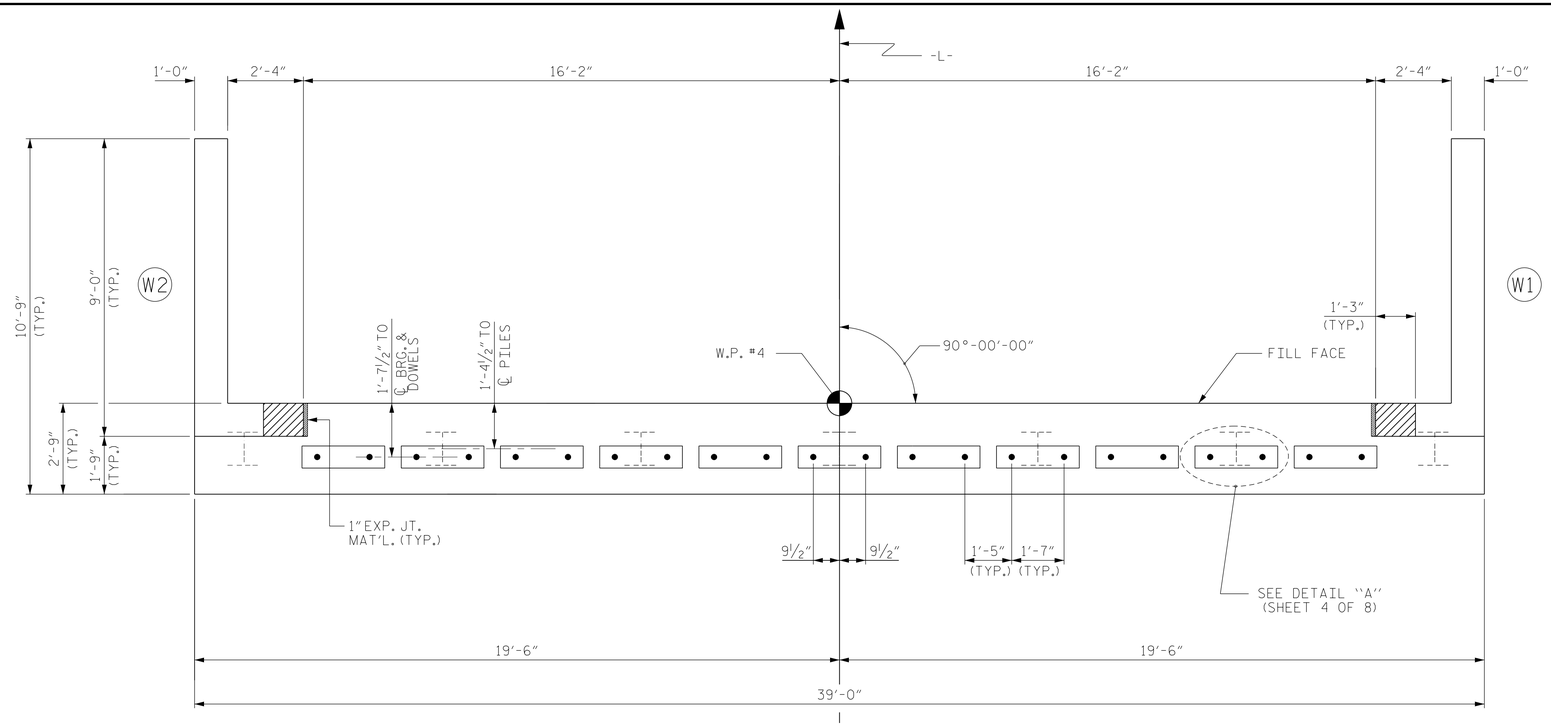
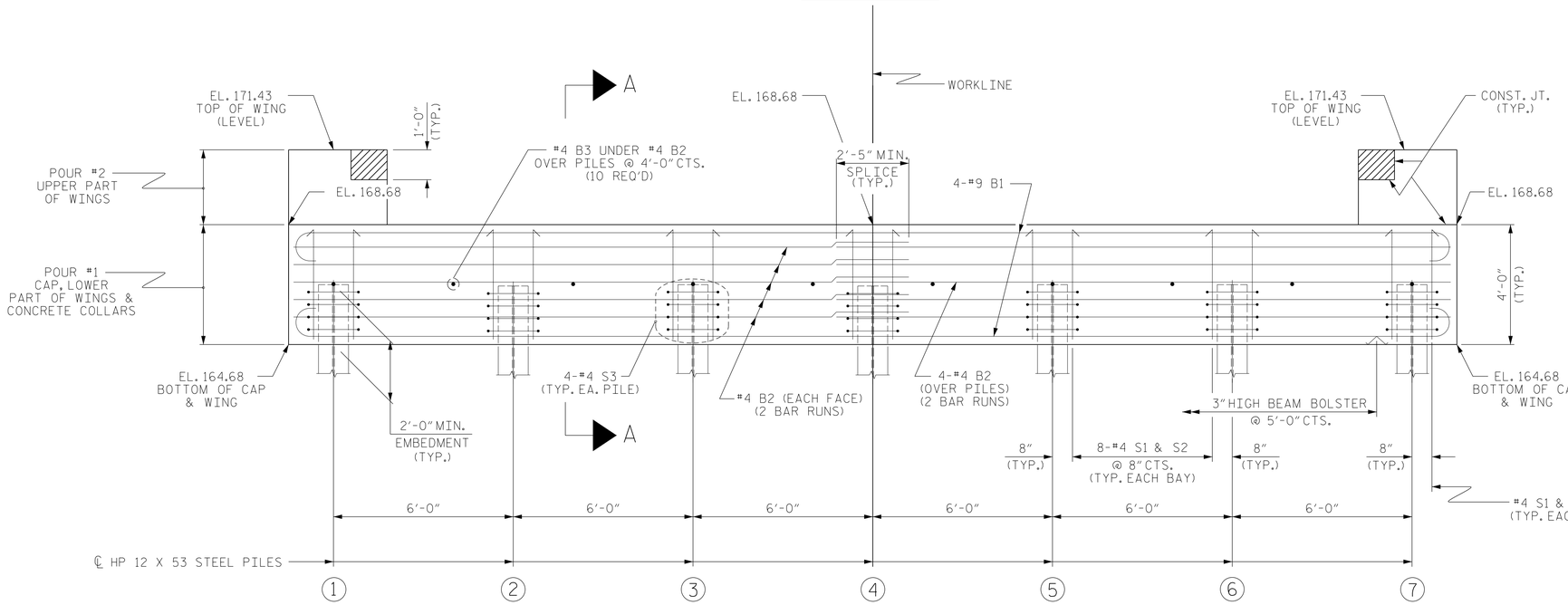
USER:ephelps



PLAN



ELEVATION

WINGS NOT SHOWN FOR CLARITY.
FOR SECTION A-A, SEE SHEET 4 OF 8.
CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY.
SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 4 OF 8.

NOTES

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE VERTICAL CONCRETE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 8.

FOR WING DETAILS, SEE SHEET 3 OF 8.

NORTH CAROLINA PROFESSIONAL SEAL 11725 ENGINEER DAVID R. RUGGLES
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PROJECT NO. 17BP.5.R.77
WARREN COUNTY
STATION: 15+02.50 -L-
SHEET 2 OF 8

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

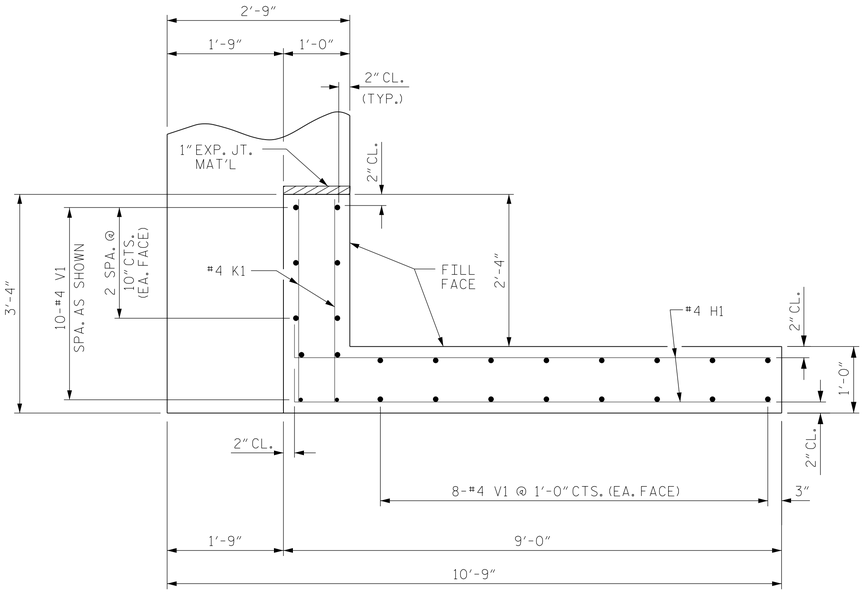
SUBSTRUCTURE

END BENT No. 2

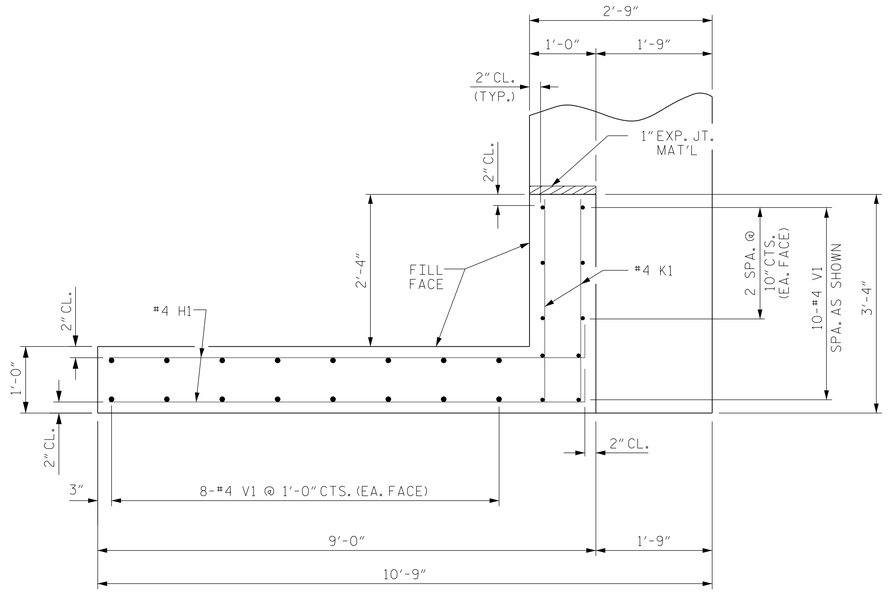
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-14
1			3			TOTAL SHEETS
2			4			22

DRAWN BY:	E. PHELPS	DATE: 2/18
CHECKED BY:	J. LOFTUS	DATE: 2/18
DESIGN ENGINEER OF RECORD:	J. LOFTUS	DATE: 2/18

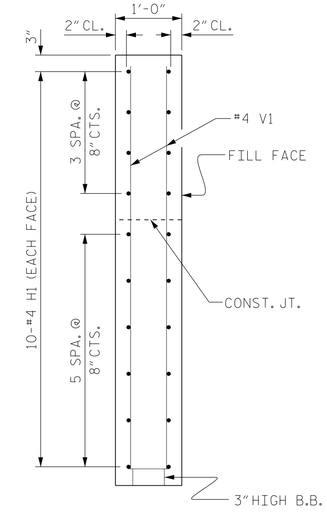
STD. NO. EB_33_90S4



PLAN OF WING (W1)

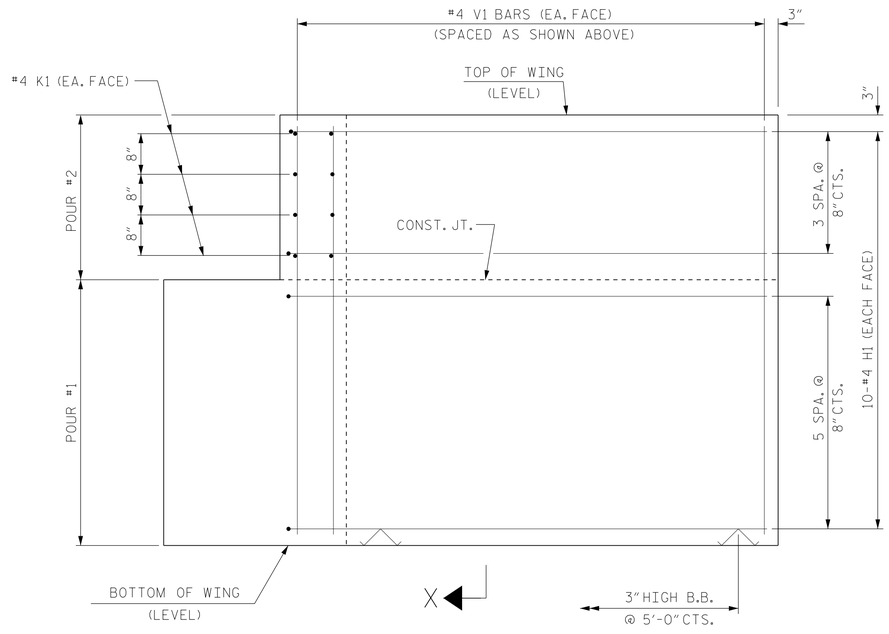


PLAN OF WING (W2)

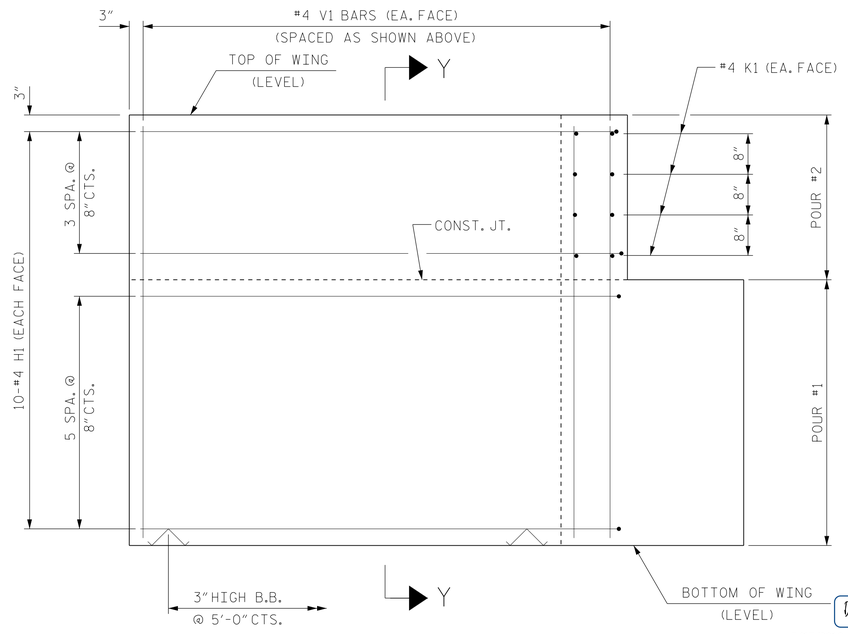


SECTION X-X

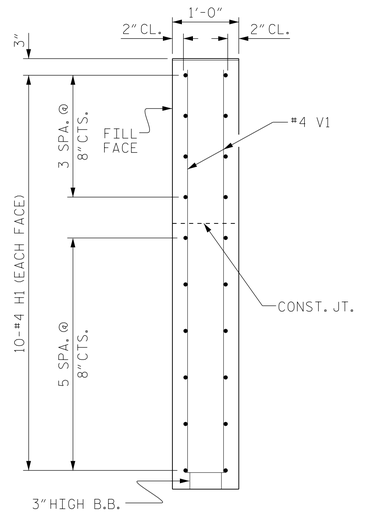
X



ELEVATION OF WING (W1)



ELEVATION OF WING (W2)



SECTION Y-Y

WING DETAILS

PROJECT NO. 17BP.5.R.77

WARREN COUNTY

STATION: 15+02.50 -L-

SHEET 3 OF 8

DRAWN BY: E. PHELPS DATE : 2/18
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SUBSTRUCTURE
END BENT
WING DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-15
1			3			TOTAL SHEETS
2			4			22

STD. NO. EB_33_90S4

WARREN 77
6/29/2018
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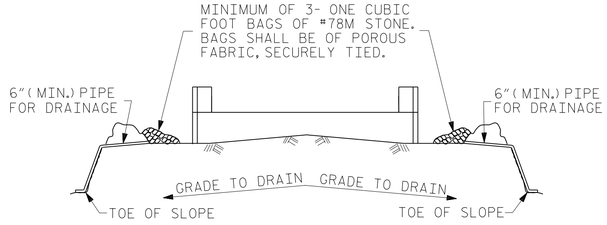
USER:ephelps

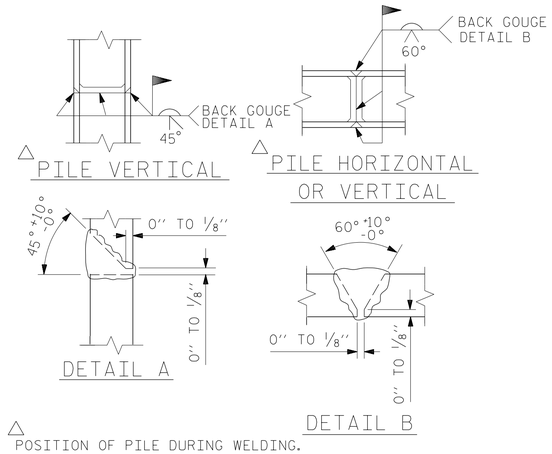


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR EFFECTIVENESS.

NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

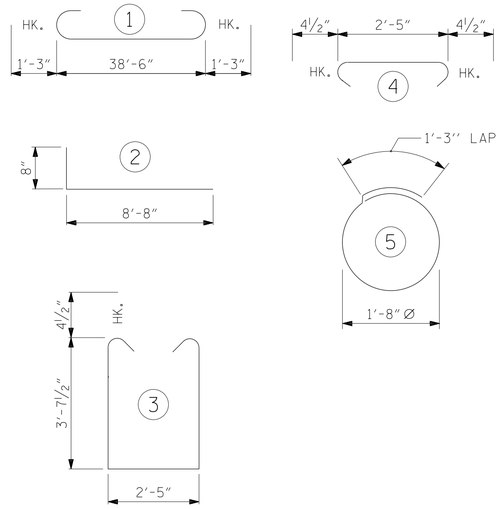
TEMPORARY DRAINAGE AT END BENT



△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

END BENT No. 1	END BENT No. 2
HP 12 X 53 STEEL PILES NO: 7 LIN. FT.= 175	HP 12 X 53 STEEL PILES NO: 7 LIN. FT.= 175
PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES NO: 7	PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES NO: 7

BILL OF MATERIAL
FOR ONE END BENT

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	1	41'-0"	1115
B2	28	#4	STR	20'-7"	385
B3	10	#4	STR	2'-5"	16
D1	22	#6	STR	1'-6"	50
H1	40	#4	2	9'-4"	249
K1	16	#4	STR	2'-11"	31
S1	50	#4	3	10'-5"	348
S2	50	#4	4	3'-2"	106
S3	28	#4	5	6'-6"	122
V1	52	#4	STR	6'-2"	214

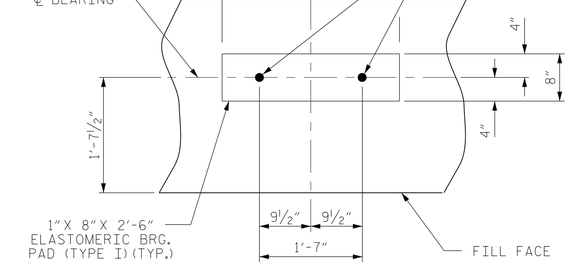
REINFORCING STEEL (FOR ONE END BENT) 2636 LBS.

CLASS A CONCRETE BREAKDOWN (FOR ONE END BENT)

POUR #1 CAP, LOWER PART OF WINGS & COLLARS 19.5 C.Y.

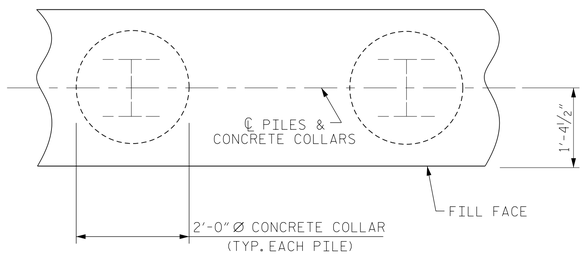
POUR #2 UPPER PART OF WINGS 2.3 C.Y.

TOTAL CLASS A CONCRETE 21.8 C.Y.



DETAIL "A"

(END BENT No. 1 SHOWN, END BENT No. 2 SIMILAR BY ROTATION)



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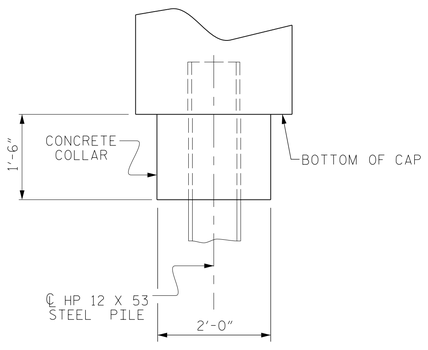
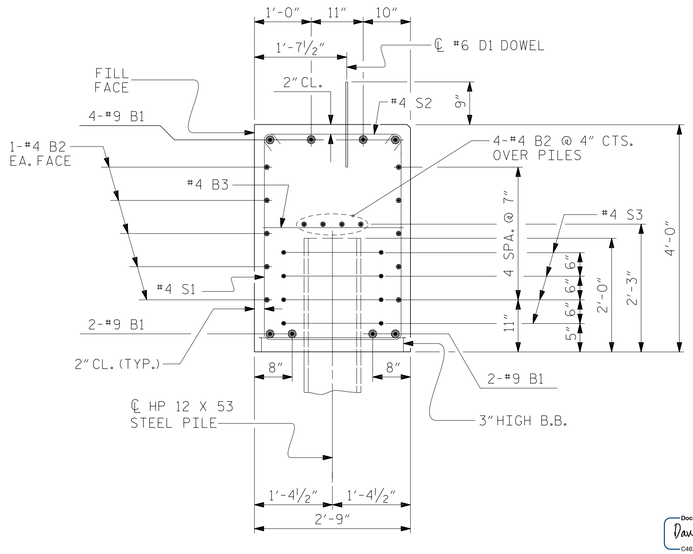


ELEVATION

CORROSION PROTECTION FOR STEEL PILES DETAIL

(END BENT No. 1 SHOWN, END BENT No. 2 SIMILAR BY ROTATION)



SECTION A-A

(CONCRETE COLLAR NOT SHOWN FOR CLARITY. SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL.")

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7/17/2018

NORTH CAROLINA PROFESSIONAL SEAL 11725 ENGINEER DAVID R RUGGLES

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PROJECT NO. 17BP.5.R.77

WARREN COUNTY

STATION: 15+02.50 -L-

SHEET 4 OF 8

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT No. 1 & 2 DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-16
1			3			TOTAL SHEETS
2			4			22

DRAWN BY: E. PHELPS DATE: 2/18
CHECKED BY: J. LOFTUS DATE: 2/18
DESIGN ENGINEER OF RECORD: J. LOFTUS DATE: 2/18

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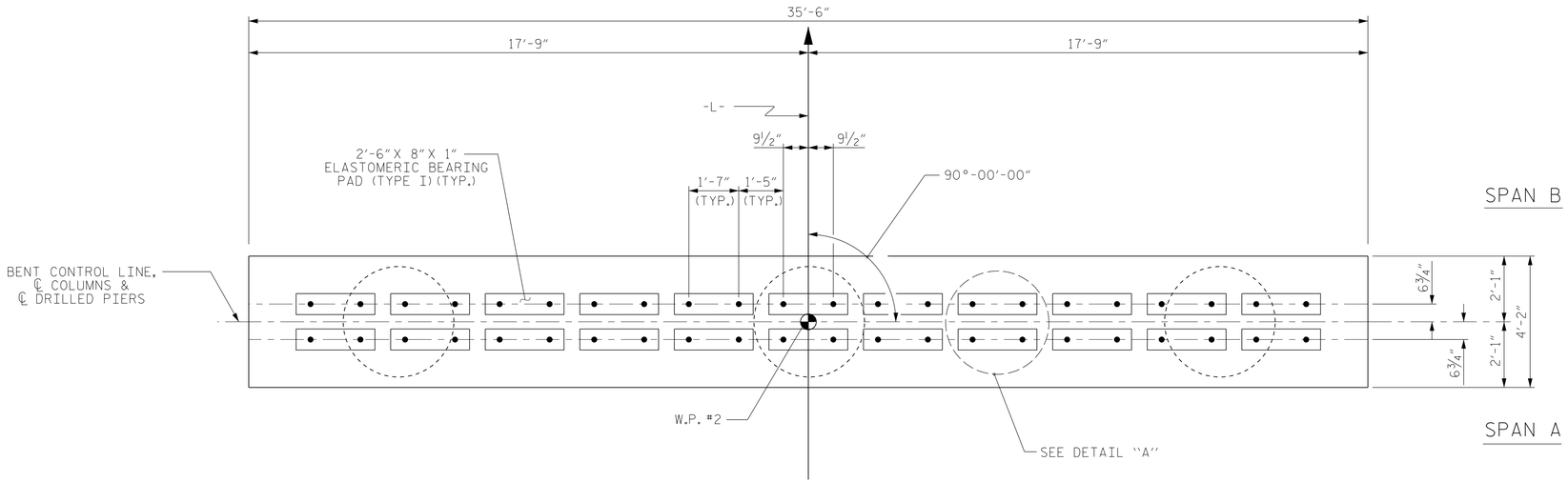
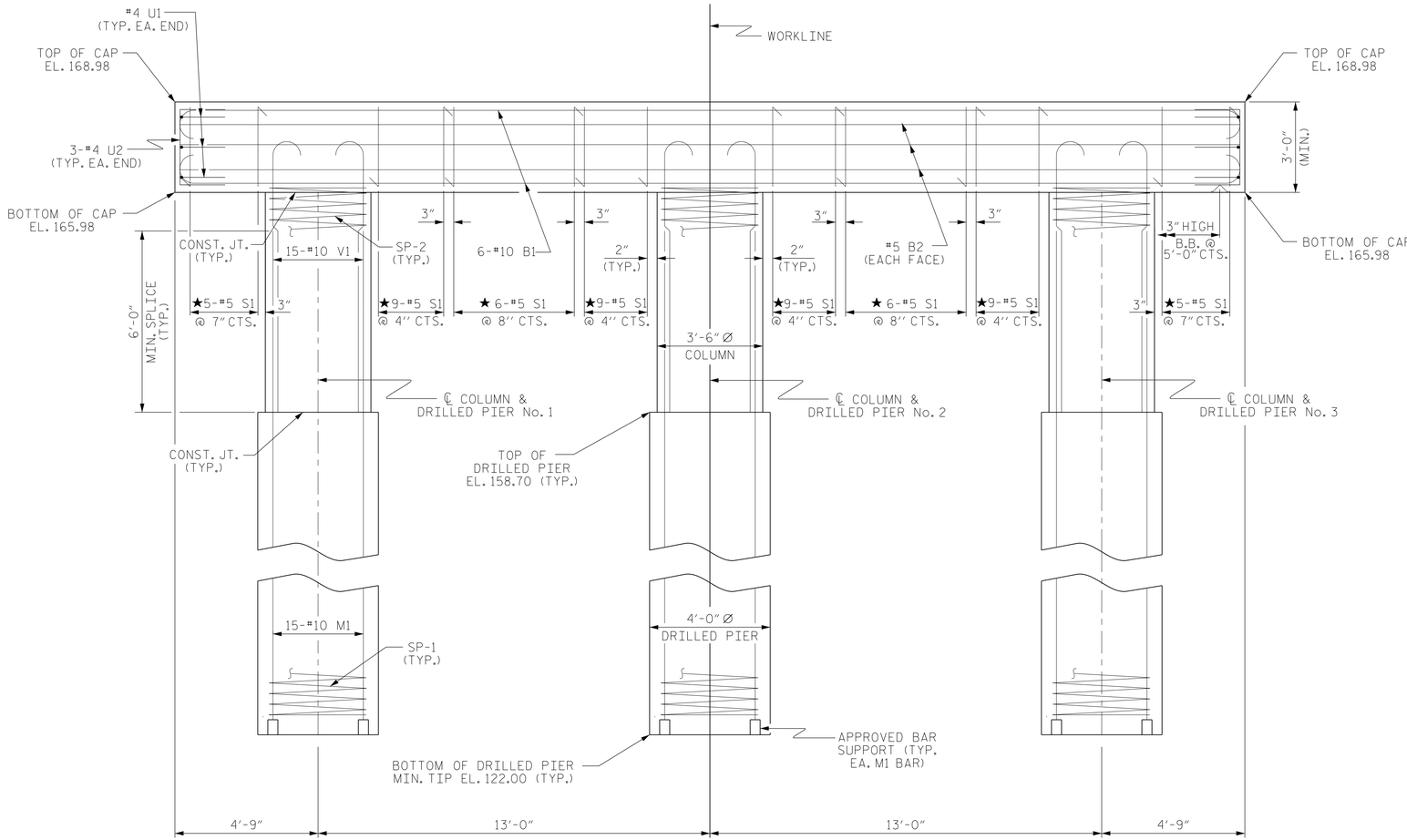
WARREN 77



PLAN



ELEVATION

DIMENSIONS & REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN & DRILLED PIER UNLESS OTHERWISE NOTED.

NOTES

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

HOOKS ON "V" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.

FOR DRILLED PIERS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

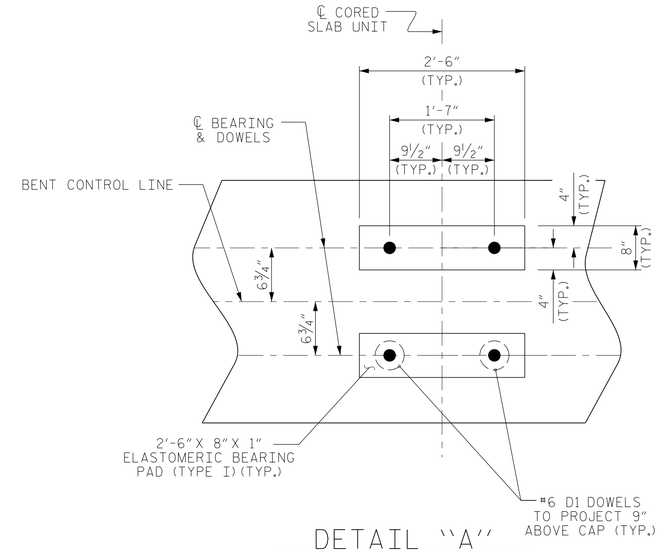
ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "REINFORCING STEEL" AND "SPIRAL COLUMN REINFORCING STEEL."

★ INVERT ALTERNATE STIRRUPS.

THE LOCATION OF THE CONSTRUCTION JOINT IN THE DRILLED PIERS IS BASED ON AN APPROXIMATE GROUND LINE ELEVATION. IF THE CONSTRUCTION JOINT IS ABOVE THE ACTUAL GROUND LINE ELEVATION, THE CONTRACTOR SHALL PLACE THE CONSTRUCTION JOINT ONE FOOT BELOW THE GROUND LINE.

DRILLED PIERS SHALL BE TERMINATED ONE FOOT ± ABOVE NORMAL WATER SURFACE ELEVATION FOR SHAFTS LOCATED IN WATER.

THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE LONGITUDINAL REINFORCEMENT FOR DRILLED PIERS IS DETAILED WITH 3 FEET OF EXTRA LENGTH.



DETAIL "A"

(DIMENSIONS ARE TYPICAL EACH BEARING)

PROJECT NO. 17BP.5.R.77

WARREN COUNTY

STATION: 15+02.50 -L-

SHEET 5 OF 8

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SUBSTRUCTURE
BENT No. 1

REVISIONS						SHEET NO.
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1			3			TOTAL SHEETS
2			4			22

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DESIGN ENGINEER OF RECORD:	J. LOFTUS	DATE : 2/18

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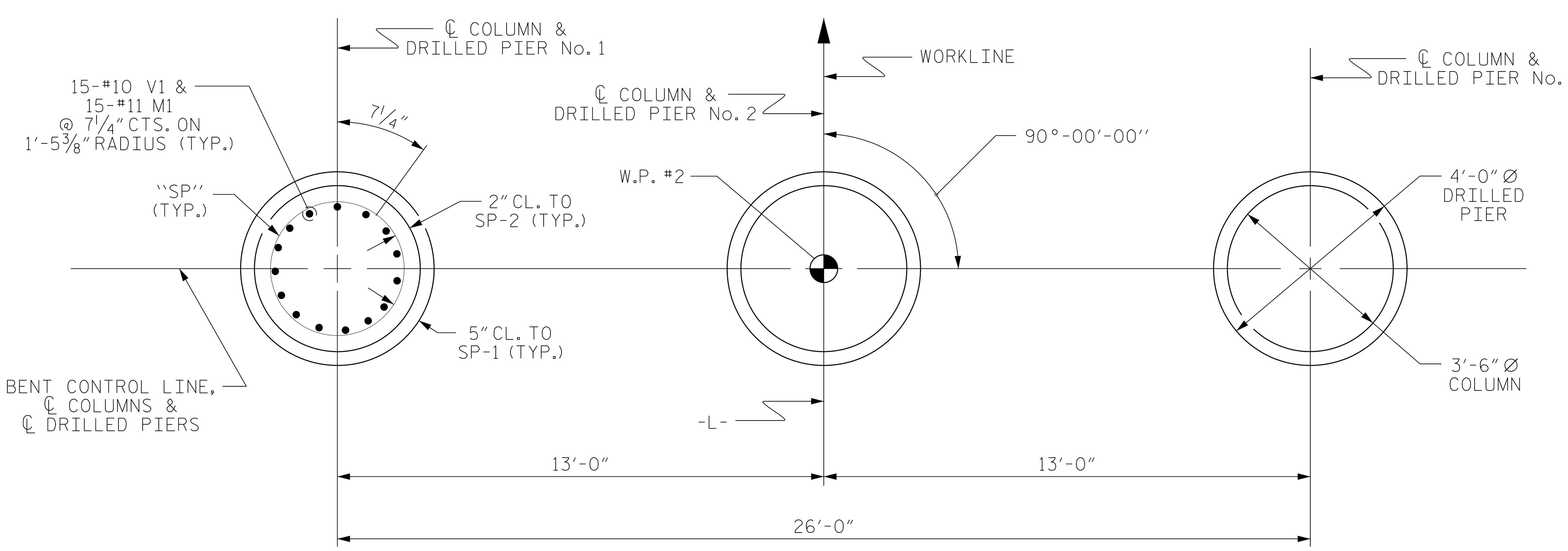
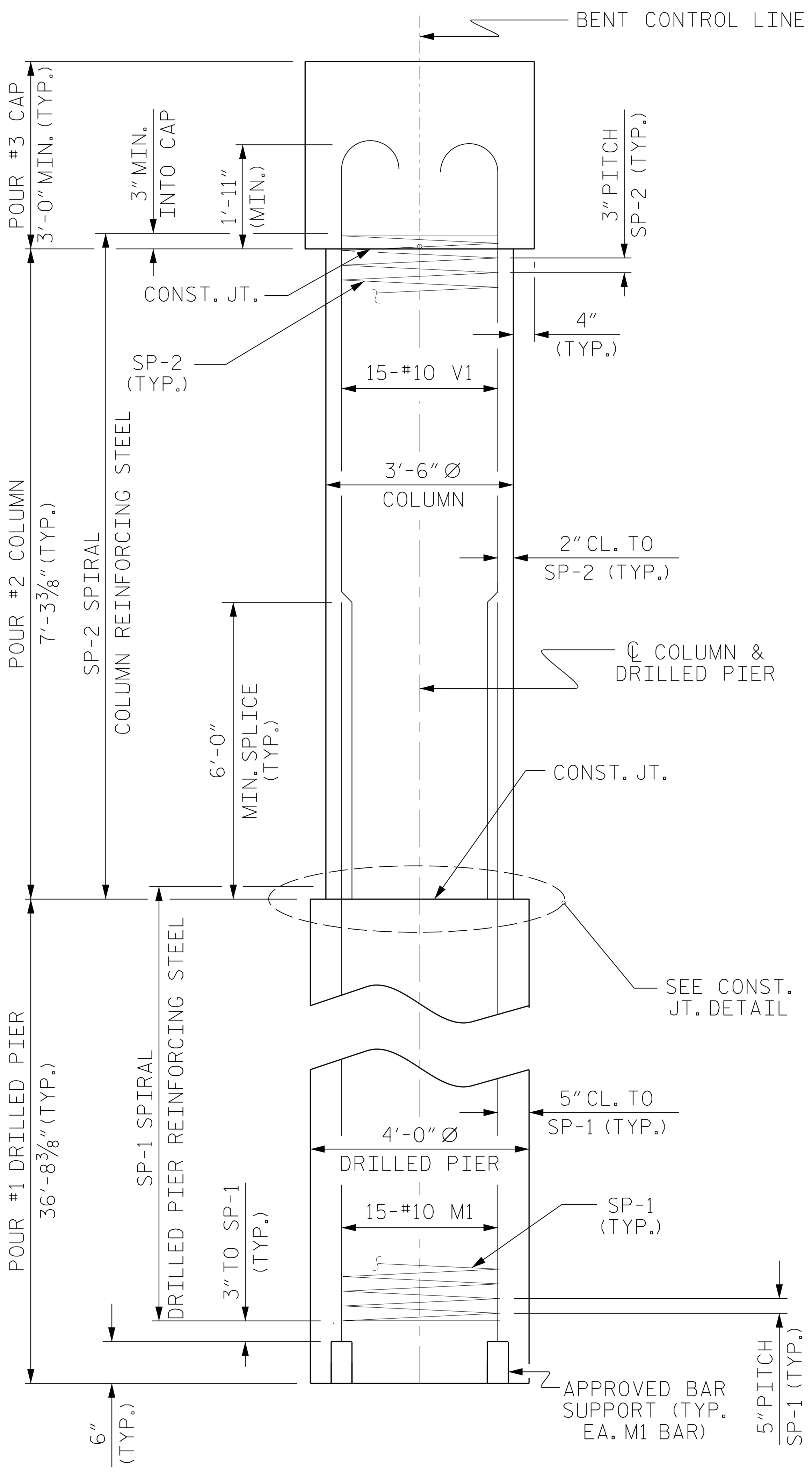
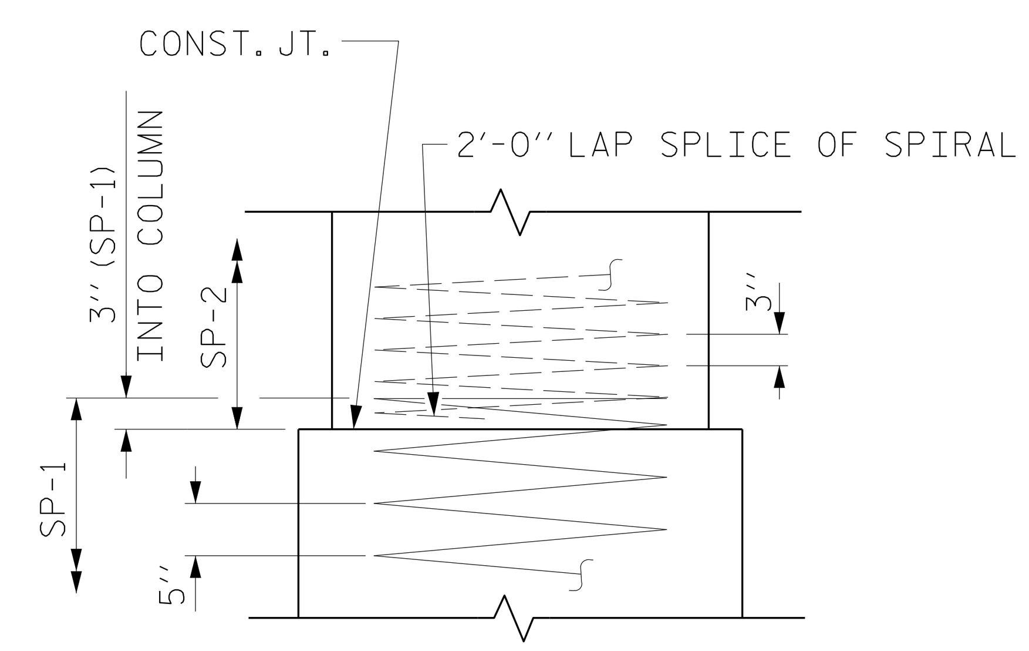


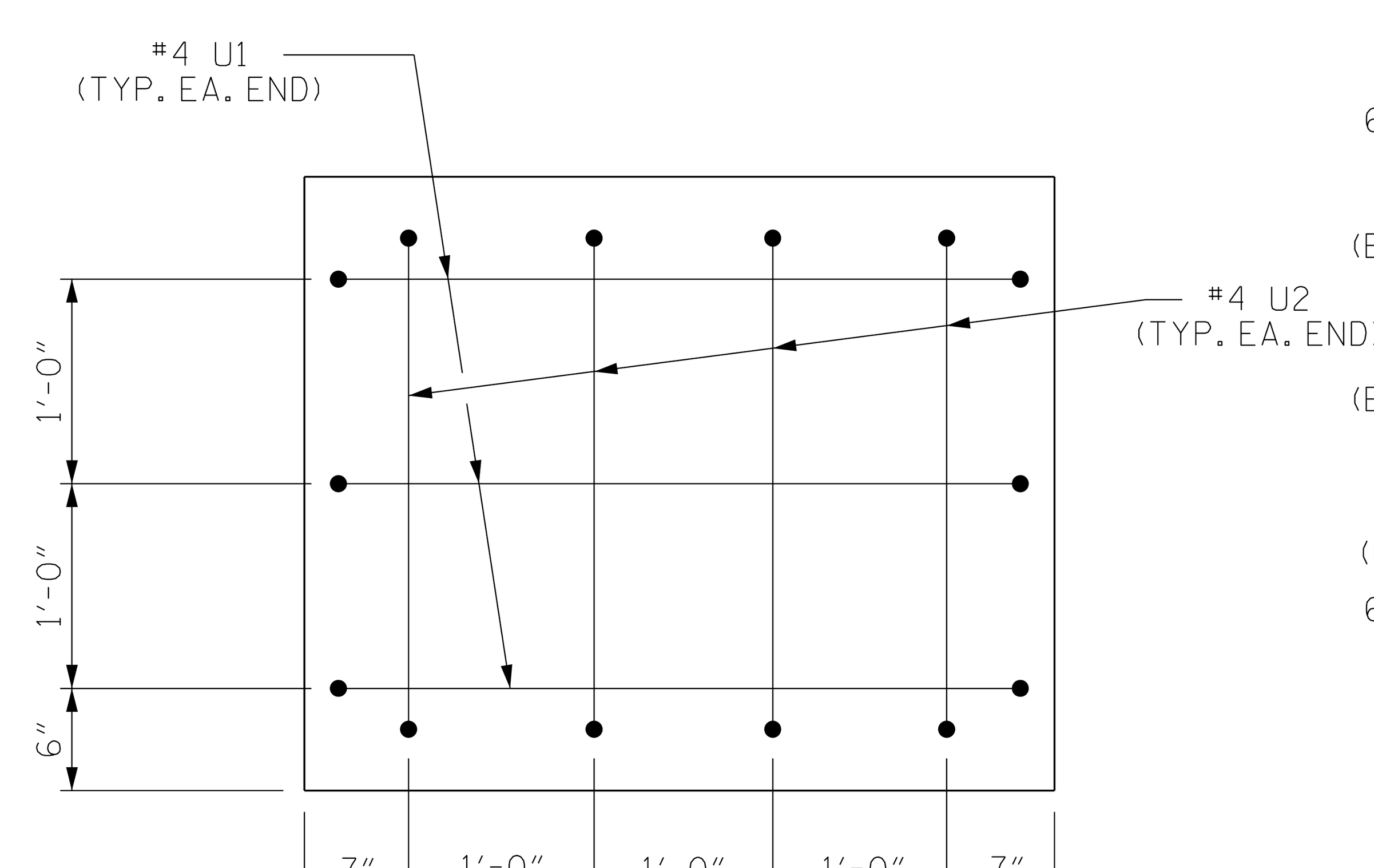
PLAN OF DRILLED PIERS & COLUMNS



END ELEVATION

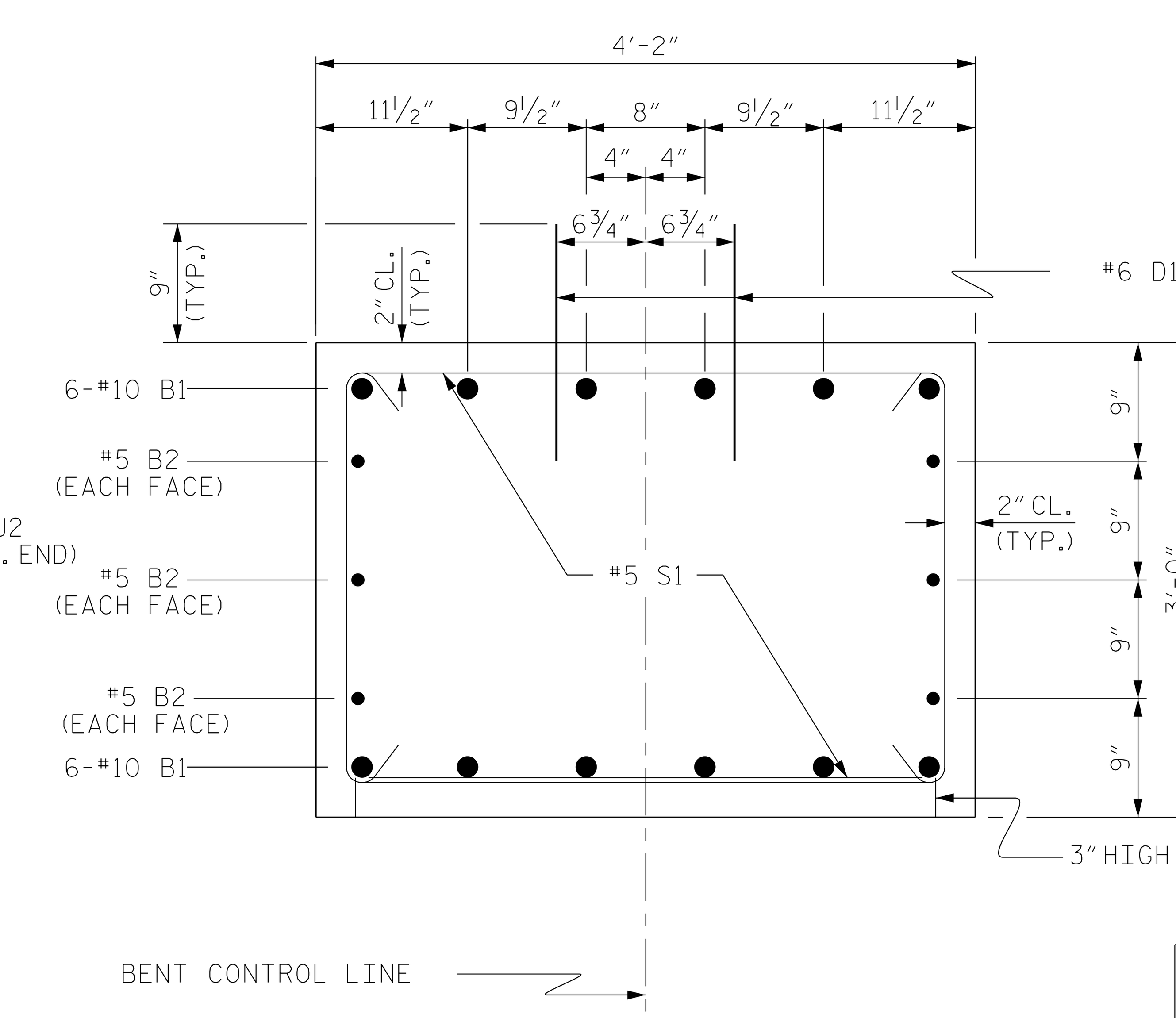


CONSTRUCTION JOINT DETAIL



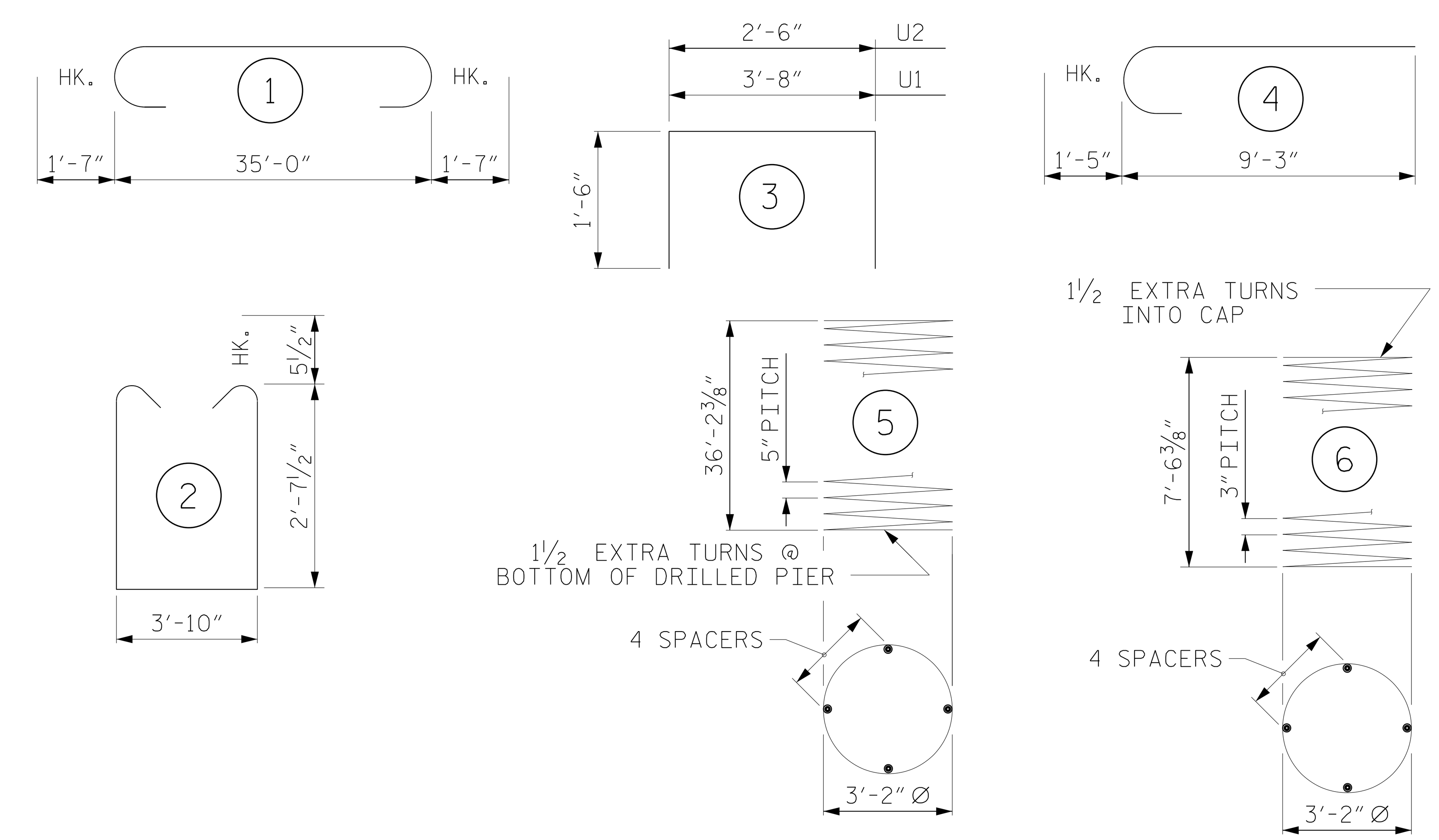
END OF CAP VIEW

(TYPICAL BOTH ENDS)



SECTION THRU CAP

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL
FOR ONE BENT

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	12	#10	1	38'-2"	1971
B2	6	#5	STR	35'-2"	220
D1	44	#6	STR	1'-6"	99
M1	45	#10	STR	45'-3"	8762
S1	58	#5	2	10'-0"	605
U1	6	#4	3	6'-8"	27
U2	8	#4	3	5'-6"	29
V1	45	#10	4	10'-8"	2065
REINFORCING STEEL (FOR ONE BENT)					13,778 LBS.
SP-1	3	*	5	865'-6"	2708
SP-2	3	**	6	310'-7"	1399
SPIRAL COLUMN REINFORCING STEEL (FOR ONE BENT)					4,107 LBS.

* THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR

** THE SP-2 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR

CLASS A CONCRETE BREAKDOWN (FOR ONE BENT)

POUR #2 (COLUMNS)	7.8 C.Y.
POUR #3 (CAP)	16.5 C.Y.
TOTAL CLASS A CONCRETE	24.3 C.Y.

DRILLED PIERS: (FOR ONE BENT)

DRILLED PIER CONCRETE POUR #1 (DRILLED PIERS)	51.2 C.Y.
4'-0" Ø DRILLED PIER NOT IN SOIL	25.0 LIN. FT.
4'-0" Ø DRILLED PIER IN SOIL	85.1 LIN. FT.
PERMANENT STEEL CASING FOR 4'-0" Ø DRILLED PIER	92.1 LIN. FT.
CSL TUBES	458.4 LIN. FT.

PROJECT NO. 17BP.5.R.77

WARREN COUNTY

STATION: 15+02.50 -L-

SHEET 6 OF 8

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 11725 DAVID R. RUGGLES

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7/17/2018

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RALEIGH

SUBSTRUCTURE

BENT No. 1

REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. S-18
TOTAL SHEETS 22

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CHECKED BY:	J. LOFTUS	DATE :	2/18
DESIGN ENGINEER OF RECORD:	J. LOFTUS	DATE :	2/18

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6/29/2018
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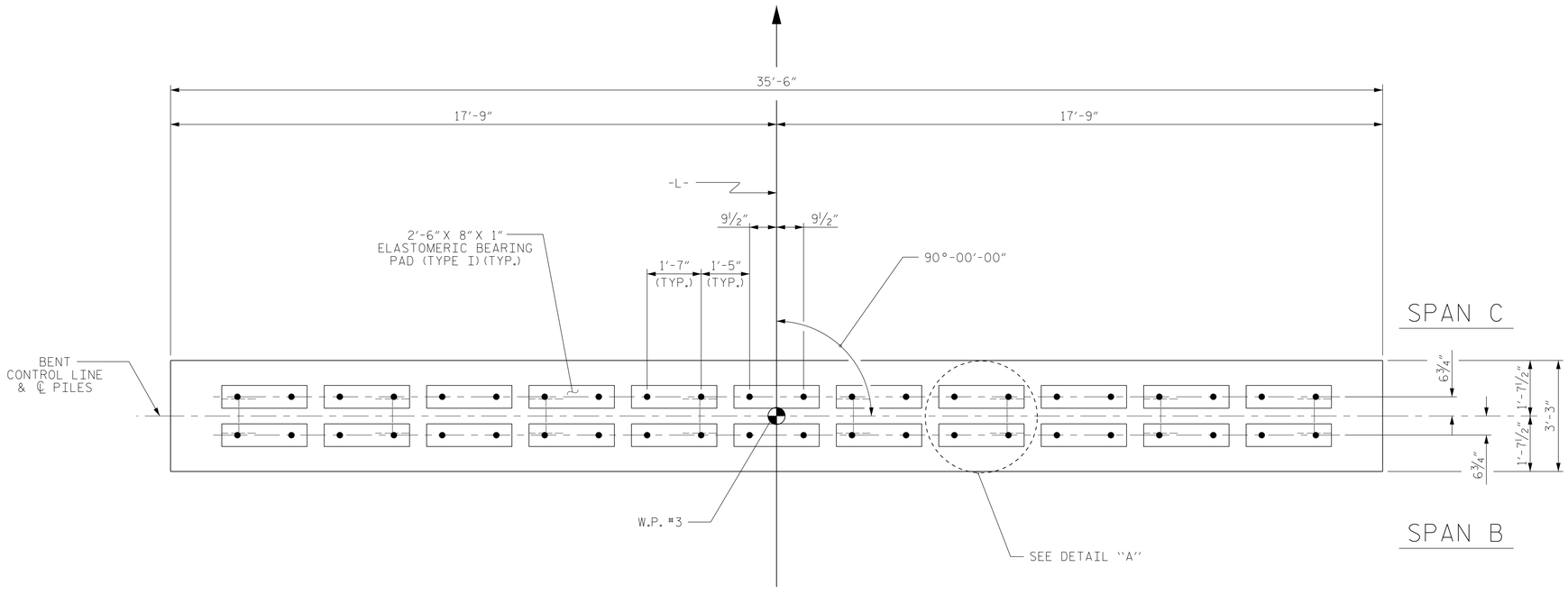
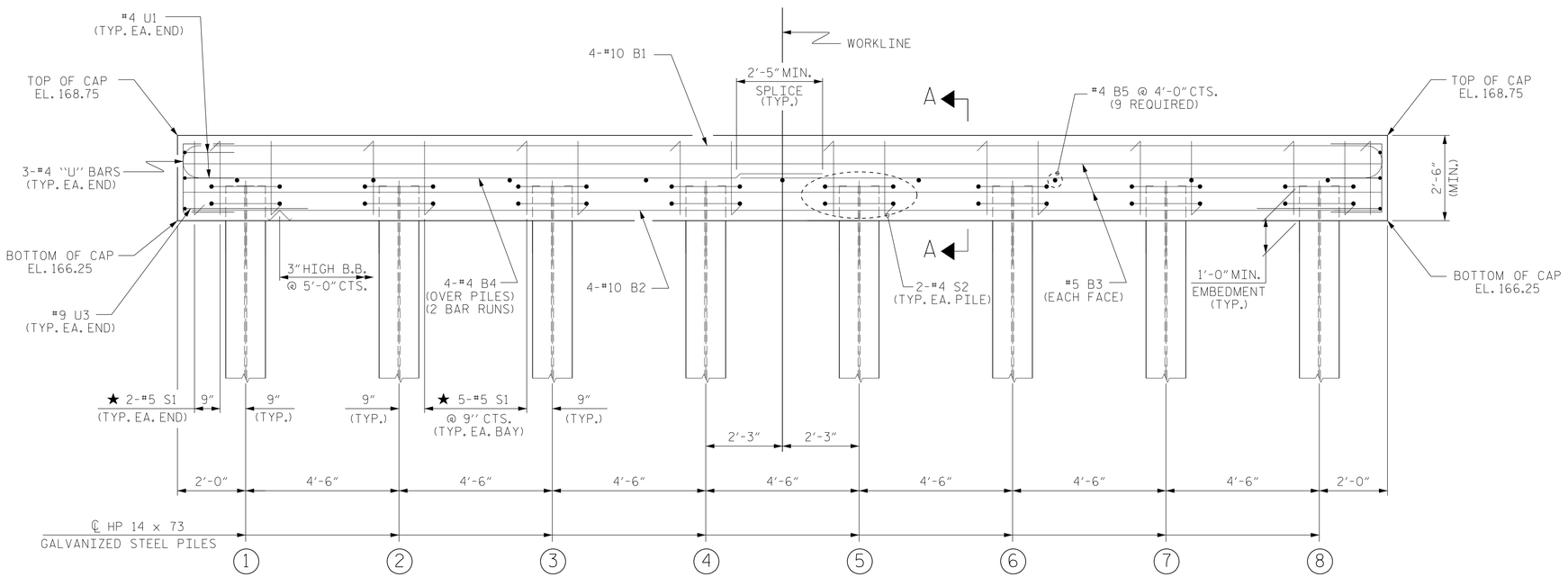
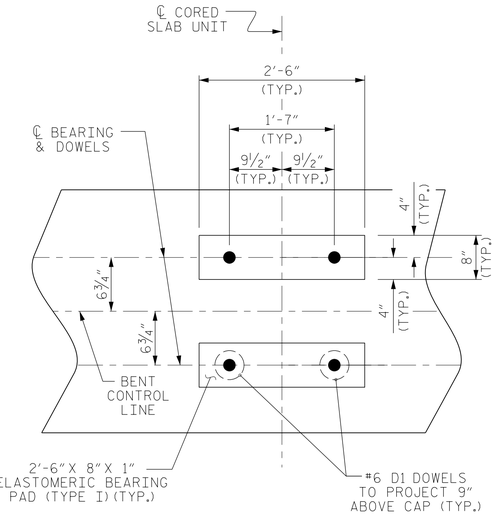


PLAN



ELEVATION

FOR SECTION A-A, SEE SHEET 8 OF 8



DETAIL ''A''

(DIMENSIONS ARE TYPICAL EACH BEARING)

NOTES

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

★ INVERT ALTERNATE STIRRUPS.

GALVANIZE THE FULL LENGTH OF EACH INTERIOR BENT PILE IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS.

PROJECT NO. 17BP.5.R.77

WARREN COUNTY

STATION: 15+02.50 -L-

SHEET 7 OF 8

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NORTH CAROLINA PROFESSIONAL SEAL 11725 ENGINEER DAVID R. RUGGLES

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SUBSTRUCTURE
BENT No. 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-19
1			3			TOTAL SHEETS
2			4			22

DRAWN BY:	E. PHELPS	DATE : 2/18
CHECKED BY:	J. LOFTUS	DATE : 2/18
DESIGN ENGINEER OF RECORD:	J. LOFTUS	DATE : 2/18

6/29/2018
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USER:ephelps

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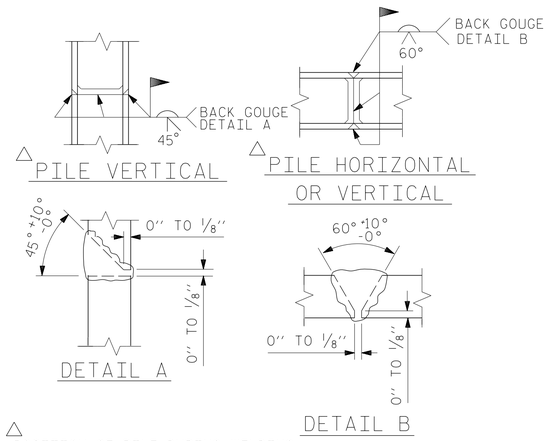
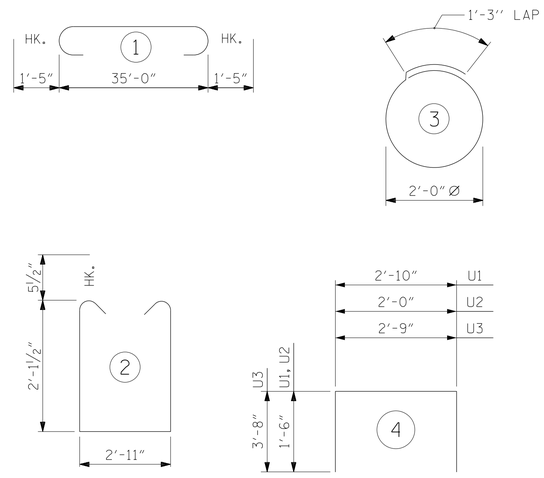


PILE SPLICE DETAILS

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

FOR ONE BENT

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	4	#10	1	37'-10"	651
B2	4	#10	STR	35'-2"	605
B3	4	#5	STR	35'-2"	147
B4	8	#4	STR	18'-10"	101
B5	9	#4	STR	2'-11"	18
D1	44	#6	STR	1'-6"	99
S1	39	#5	2	8'-1"	329
S2	16	#4	3	7'-7"	81
U1	4	#4	4	5'-10"	16
U2	6	#4	4	5'-0"	20
U3	2	#9	4	10'-1"	69

REINFORCING STEEL (FOR ONE BENT) 2136 LBS

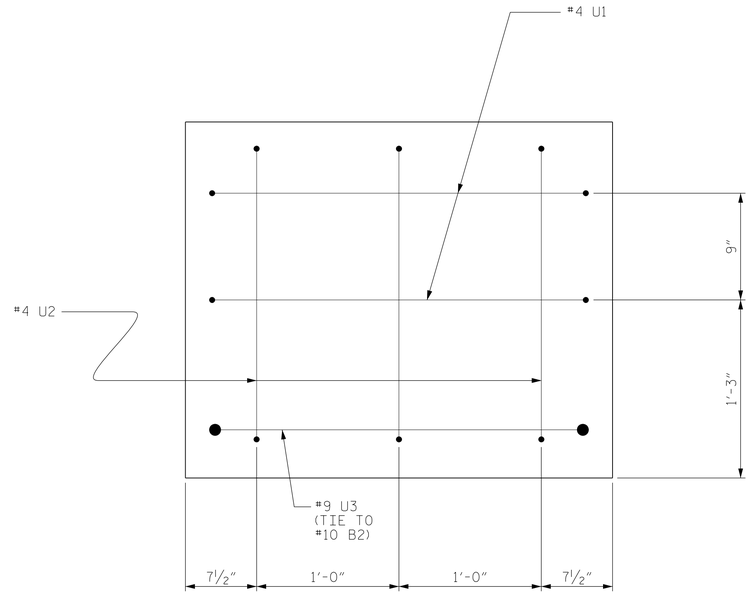
CLASS A CONCRETE BREAKDOWN (FOR ONE BENT)

TOTAL CLASS A CONCRETE 10.7 C.Y.

HP 14 X 73 GALVANIZED STEEL PILES (FOR ONE BENT)

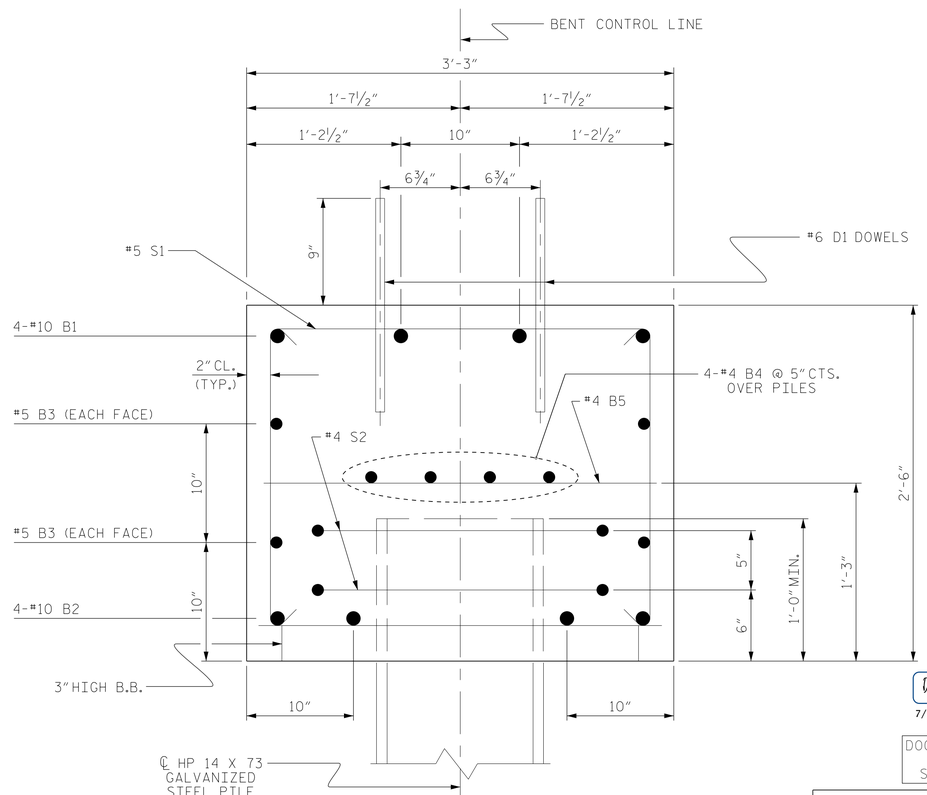
No. 8 LIN. FT. 240

PILE DRIVING EQUIPMENT SETUP FOR HP 14 X 73 GALVANIZED STEEL PILES (FOR ONE BENT) NO: 8



END OF CAP VIEW

(TYPICAL BOTH ENDS)



SECTION A-A

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STATE OF NORTH CAROLINA PROFESSIONAL SEAL 11725 ENGINEER DAVID R. RUGGLES

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PROJECT NO. 17BP.5.R.77

WARREN COUNTY

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SHEET 8 OF 8

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT No. 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-20
1			3			TOTAL SHEETS
2			4			22

DRAWN BY:	E. PHELPS	DATE : 2/18
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DESIGN ENGINEER OF RECORD:	J. LOFTUS	DATE : 2/18

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6/29/2018
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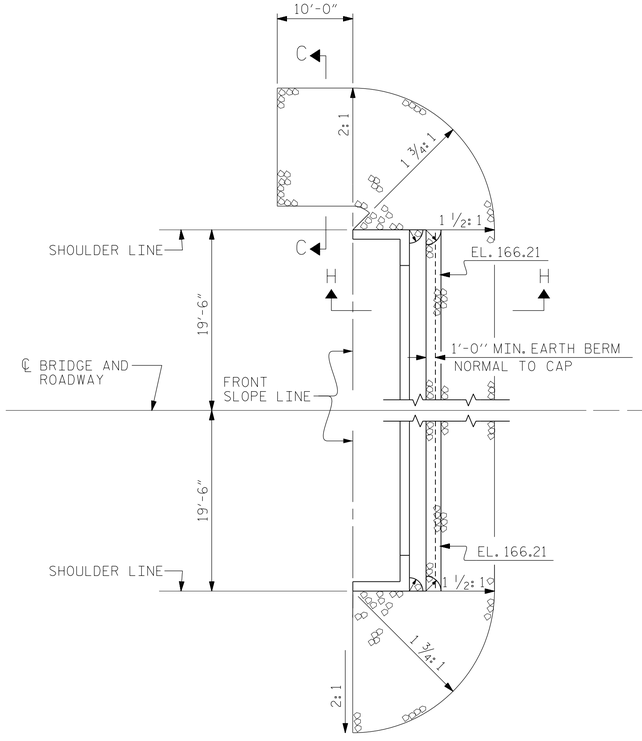
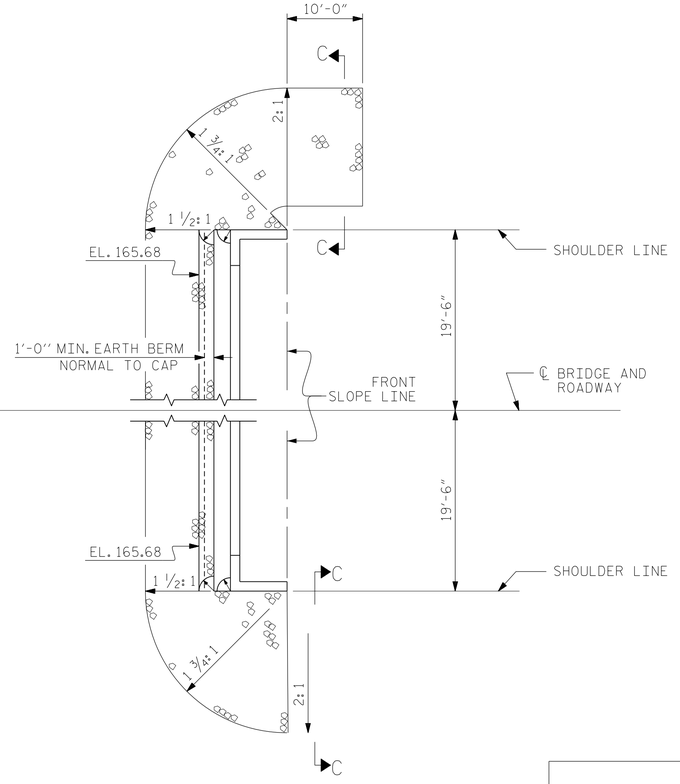
STD. NO. 14"HP_BT_33_90S_<60'



END BENT NO. 1



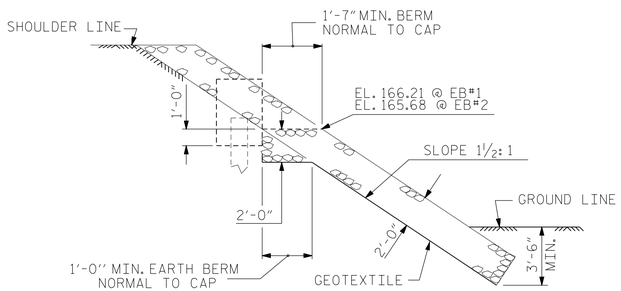
END BENT NO. 2

NOTES :

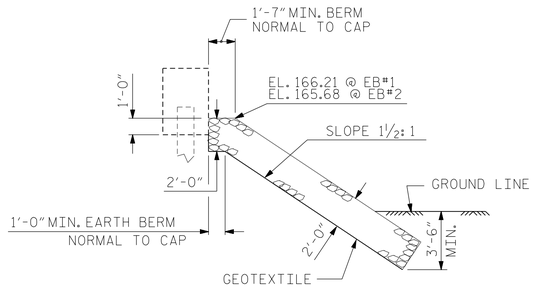
FOR BERM WIDTH DIMENSIONS, SEE GENERAL DRAWING.

ESTIMATED QUANTITIES		
BRIDGE @ STA. 15+02.50 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	77	85
END BENT 2	68	75

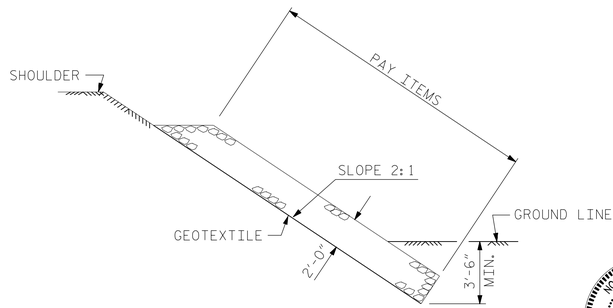
PLAN OF RIP RAP



SECTION H-H



℄ SECTION BERM RIP RAPPED



SECTION C-C

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7/17/2018

NORTH CAROLINA PROFESSIONAL SEAL 11725 ENGINEER DAVID R RUGGLES

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PROJECT NO. 17BP.5.R.77

WARREN COUNTY

STATION: 15+02.50 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

RIP RAP DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-21
1			3			TOTAL SHEETS
2			4			22

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STD. NO. RR1 (Sht 2)

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6/29/2018
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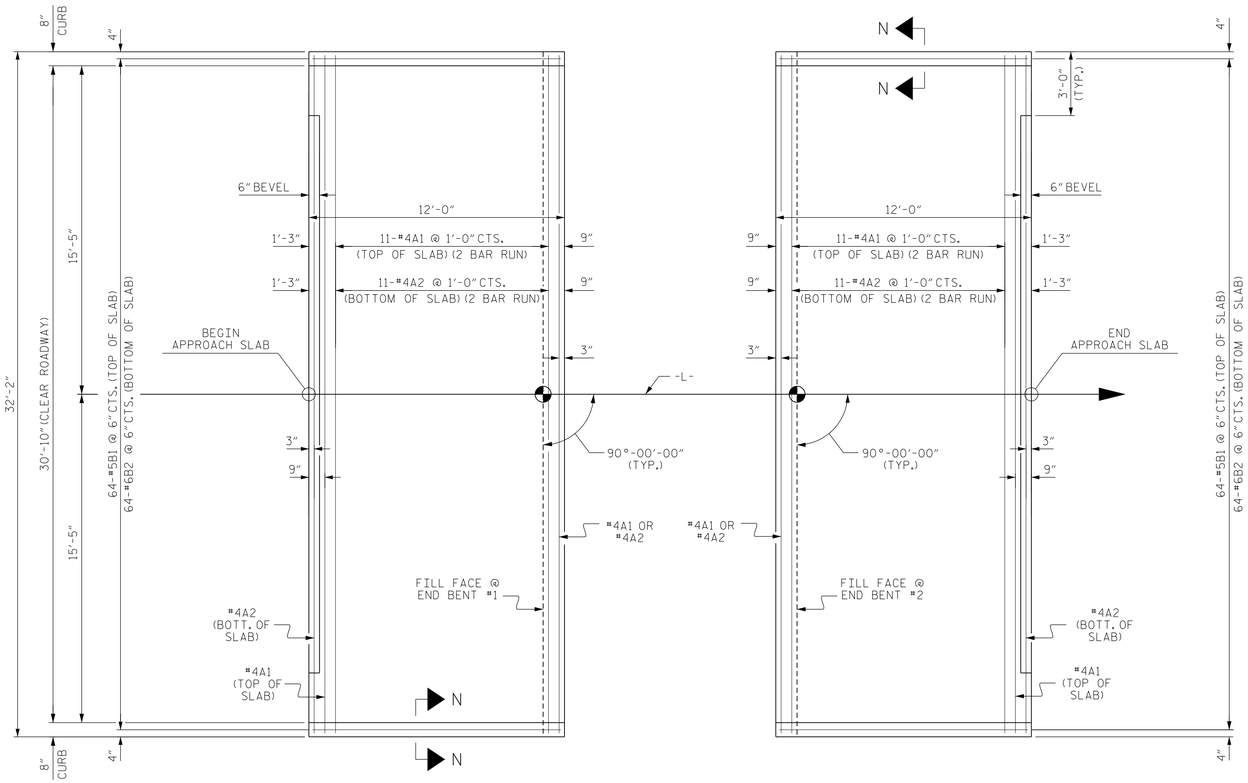
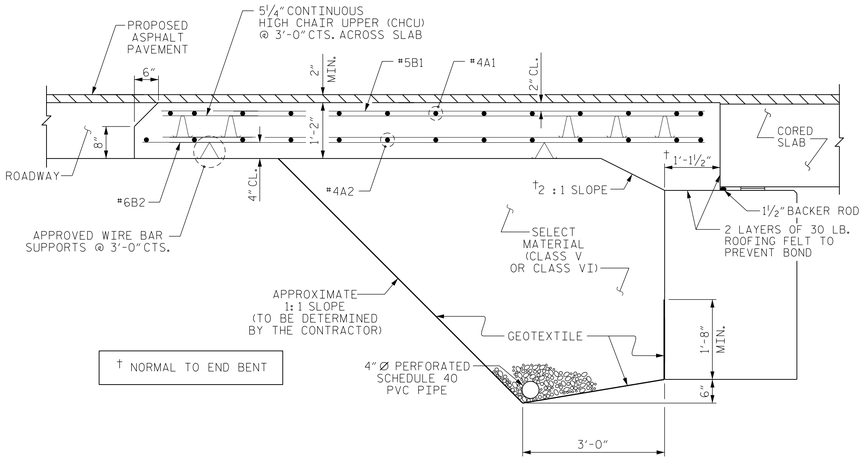


PLAN @ END BENT #1

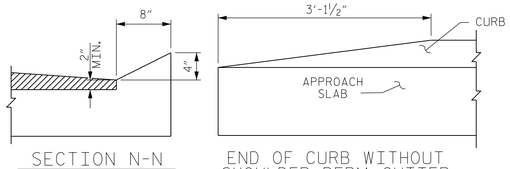
PLAN @ END BENT #2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS



SECTION THRU SLAB

(TYPE II - MODIFIED APPROACH FILL)



SECTION N-N

END OF CURB WITHOUT SHOULDER BERM GUTTER

CURB DETAILS

SPLICE LENGTHS		
BAR SIZE	EPOXY COATED	UNCOATED
#4	2'-0"	1'-9"
#5	2'-6"	2'-2"
#6	3'-10"	2'-7"

NOTES

FOR BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, 4" Ø DRAINAGE PIPE, AND SELECT MATERIAL BACKFILL, SEE ROADWAY PLANS.

GEOTEXTILE SHALL BE TYPE 1 IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS SECTION 1056.

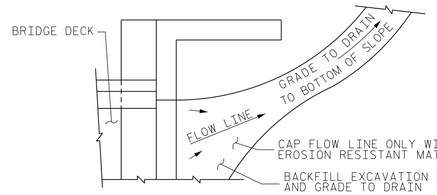
SELECT MATERIAL BACKFILL (CLASS V OR CLASS VI) SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 1016.

SELECT MATERIAL BACKFILL IS TO BE CONTINUOUS ALONG FILL FACE OF BACKWALL FROM OUTSIDE EDGE TO OUTSIDE EDGE OF APPROACH SLAB.

FOR THE 4" Ø DRAINAGE PIPE OUTLET(S), SEE ROADWAY STANDARD DRAWINGS.

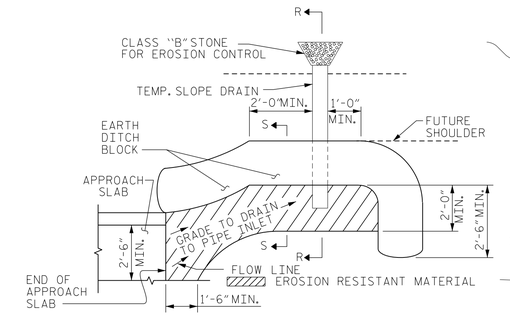
AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.

APPROACH SLAB GROOVING IS NOT REQUIRED.



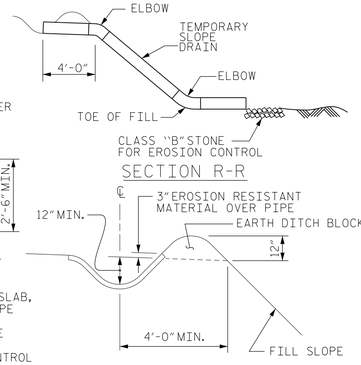
NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT TO THE STRUCTURE. THE CONTRACTOR WILL BE REQUIRED TO REMOVE THESE MATERIALS PRIOR TO CONSTRUCTION OF THE APPROACH SLAB.

TEMPORARY DRAINAGE DETAIL



NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN. 2" DEPTH, 2) EROSION CONTROL MAT, OR 3) CONCRETE, AS DIRECTED BY THE ENGINEER. THE SLOPE DRAIN SHALL CONSIST OF A NON-PERFORATED TEMPORARY DRAINAGE PIPE, 12 INCHES IN DIAMETER.

PLAN VIEW



SECTION S-S

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

BILL OF MATERIAL					
APPROACH SLAB AT EB #1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱ A1	26	#4	STR	16'-11"	294
A2	26	#4	STR	16'-9"	291
✱ B1	64	#5	STR	11'-2"	745
B2	64	#6	STR	11'-8"	1121
REINFORCING STEEL				LBS.	1412
✱ EPOXY COATED REINFORCING STEEL				LBS.	1039
CLASS AA CONCRETE				C.Y.	19.5
APPROACH SLAB AT EB #2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱ A1	26	#4	STR	16'-11"	294
A2	26	#4	STR	16'-9"	291
✱ B1	64	#5	STR	11'-2"	745
B2	64	#6	STR	11'-8"	1121
REINFORCING STEEL				LBS.	1412
✱ EPOXY COATED REINFORCING STEEL				LBS.	1039
CLASS AA CONCRETE				C.Y.	19.5

PROJECT NO. 17BP.5.R.77

WARREN COUNTY

STATION: 15+02.50 -L-

DocuSigned by: David Ruggles C462768DF412422... 7/17/2018

NORTH CAROLINA PROFESSIONAL SEAL 11725 ENGINEER DAVID R. RUGGLES

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD BRIDGE APPROACH SLAB FOR PRESTRESSED CONCRETE CORED SLAB UNIT (SUB-REGIONAL TIER) 90° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-22
1			3			TOTAL SHEETS
2			4			22

DRAWN BY:	E. PHELPS	DATE: 2/18
CHECKED BY:	J. LOFTUS	DATE: 2/18
DESIGN ENGINEER OF RECORD:	J. LOFTUS	DATE: 2/18

7/17/2018
...\400_022_920077_SMU_AS01.dgn
USER:default

WARREN 77

STD. NO. BAS_33_90S

STANDARD NOTES

DESIGN DATA:

SPECIFICATIONS	A.A.S.H.T.O. (CURRENT)
LIVE LOAD	SEE PLANS
IMPACT ALLOWANCE	SEE A.A.S.H.T.O.
STRESS IN EXTREME FIBER OF STRUCTURAL STEEL - AASHTO M270 GRADE 36	20,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50W	27,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50	27,000 LBS. PER SQ. IN.
REINFORCING STEEL IN TENSION - GRADE 60	24,000 LBS. PER SQ. IN.
CONCRETE IN COMPRESSION	1,200 LBS. PER SQ. IN.
CONCRETE IN SHEAR	SEE A.A.S.H.T.O.
STRUCTURAL TIMBER - TREATED OR UNTREATED EXTREME FIBER STRESS	1,800 LBS. PER SQ. IN.
COMPRESSION PERPENDICULAR TO GRAIN OF TIMBER	375 LBS. PER SQ. IN.
EQUIVALENT FLUID PRESSURE OF EARTH	30 LBS. PER CU. FT. (MINIMUM)

MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2018 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N. C. DEPARTMENT OF TRANSPORTATION.

STEEL SHEET PILING FOR PERMANENT OR TEMPORARY APPLICATIONS SHALL BE HOT ROLLED.

CONCRETE:

UNLESS OTHERWISE REQUIRED ON PLANS, CLASS A CONCRETE SHALL BE USED FOR ALL PORTIONS OF ALL STRUCTURES WITH THE EXCEPTION THAT: CLASS AA CONCRETE SHALL BE USED IN BRIDGE SUPERSTRUCTURES, ABUTMENT BACKWALLS, AND APPROACH SLABS; AND CLASS B CONCRETE SHALL BE USED FOR SLOPE PROTECTION AND RIP RAP.

CONCRETE CHAMFERS:

UNLESS OTHERWISE NOTED ON THE PLANS, ALL EXPOSED CORNERS ON STRUCTURES SHALL BE CHAMFERED ¾" WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO 1½" RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A ¼" FINISHING TOOL UNLESS OTHERWISE REQUIRED ON PLANS; AND CORNERS OF EXPANSION JOINTS IN THE ROADWAY FACES AND TOPS OF CURBS AND SIDEWALKS SHALL BE ROUNDED TO A ¼" RADIUS WITH A FINISHING STONE OR TOOL UNLESS OTHERWISE REQUIRED ON PLANS.

DOWELS:

DOWELS WHEN INDICATED ON PLANS AS FOR CULVERT EXTENSIONS, SHALL BE EMBEDDED AT LEAST 12" INTO THE OLD CONCRETE AND GROUTED INTO PLACE WITH 1:2 CEMENT MORTAR.

ALLOWANCE FOR DEAD LOAD DEFLECTION, SETTLEMENT, ETC. IN CASTING SUPERSTRUCTURES:

BRIDGES SHALL BE BUILT ON THE GRADE OR VERTICAL CURVE SHOWN ON PLANS. SLABS, CURBS AND PARAPETS SHALL CONFORM TO THE GRADE OR CURVE.

ALL DIMENSIONS WHICH ARE GIVEN IN SECTION AND ARE AFFECTED BY DEAD LOAD DEFLECTIONS ARE DIMENSIONS AT CENTER LINE OF BEARING UNLESS OTHERWISE NOTED ON PLANS. IN SETTING FORMS FOR STEEL BEAM BRIDGES AND PRESTRESSED CONCRETE GIRDER BRIDGES, ADJUSTMENTS SHALL BE MADE DUE TO THE DEAD LOAD DEFLECTIONS FOR THE ELEVATIONS SHOWN. WHERE BLOCKS ARE SHOWN OVER BEAMS FOR BUILDING UP TO THE SLAB, THE VERTICAL DIMENSIONS OF THE BLOCKS SHALL BE ADJUSTED BETWEEN BEARINGS TO COMPENSATE FOR DEAD LOAD DEFLECTIONS, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER. WHERE BOTTOM OF SLAB IS IN LINE WITH BOTTOM OF TOP FLANGES, DEPTH OF SLAB BETWEEN BEARINGS SHALL BE ADJUSTED TO COMPENSATE FOR DEAD LOAD DEFLECTION, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER.

IN SETTING FALSEWORK AND FORMS FOR REINFORCED CONCRETE SPANS, AN ALLOWANCE SHALL BE MADE FOR DEAD LOAD DEFLECTIONS, SETTLEMENT OF FALSEWORK, AND PERMANENT CAMBER WHICH SHALL BE PROVIDED FOR IN ADDITION TO THE ELEVATIONS SHOWN. AFTER REMOVAL OF THE FALSEWORK, THE FINISHED STRUCTURES SHALL CONFORM TO THE PROFILE AND ELEVATIONS SHOWN ON THE PLANS AND CONSTRUCTION ELEVATIONS FURNISHED BY THE ENGINEER.

DETAILED DRAWINGS FOR FALSEWORK OR FORMS FOR BRIDGE SUPERSTRUCTURE AND ANY STRUCTURE OR PARTS OF A STRUCTURE AS NOTED ON THE PLANS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL BEFORE CONSTRUCTION OF THE FALSEWORK OR FORMS IS STARTED.

REINFORCING STEEL:

ALL REINFORCING STEEL SHALL BE DEFORMED. DIMENSIONS RELATIVE TO PLACEMENT OF REINFORCING ARE TO CENTERS OF BARS UNLESS OTHERWISE INDICATED IN THE PLANS. DIMENSIONS ON BAR DETAILS ARE TO CENTERS OF BARS OR ARE OUT TO OUT AS INDICATED ON PLANS.

WIRE BAR SUPPORTS SHALL BE PROVIDED FOR REINFORCING STEEL WHERE INDICATED ON THE PLANS. WHEN BAR SUPPORT PIECES ARE PLACED IN CONTINUOUS LINES, THEY SHALL BE SO PLACED THAT THE ENDS OF THE SUPPORTING WIRES SHALL BE LAPPED TO LOCK LEGS ON ADJOINING PIECES.

STRUCTURAL STEEL:

AT THE CONTRACTOR'S OPTION, HE MAY SUBSTITUTE ⅞" Ø SHEAR STUDS FOR THE ¾" Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - ⅞" Ø STUDS FOR 4 - ¾" Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF ⅞" Ø STUDS ALONG THE BEAM AS SHOWN FOR ¾" Ø STUDS BASED ON THE RATIO OF 3 - ⅞" Ø STUDS FOR 4 - ¾" Ø STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-0".

EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST 5/16" IN THICKNESS AND DO NOT EXCEED A WIDTH EQUAL TO THE FLANGE WIDTH LESS 2" OR A THICKNESS EQUAL TO 2 TIMES THE FLANGE THICKNESS. THE SIZE OF FILLET WELDS SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT ANSI/AASHTO/AWS "BRIDGE WELDING CODE". ELECTROSLAG WELDING WILL NOT BE PERMITTED.

WITH THE SOLE EXCEPTION OF EDGES AT SURFACES WHICH BEAR ON OTHER SURFACES, ALL SHARP EDGES AND ENDS OF SHAPES AND PLATES SHALL BE SLIGHTLY ROUNDED BY SUITABLE MEANS TO A RADIUS OF APPROXIMATELY 1/16 INCH OR EQUIVALENT FLAT SURFACE AT A SUITABLE ANGLE PRIOR TO PAINTING, GALVANIZING, OR METALLIZING.

HANDRAILS AND POSTS:

METAL STANDARDS AND FACES OF THE CONCRETE END POSTS FOR THE METAL RAIL SHALL BE SET NORMAL TO THE GRADE OF THE CURB, UNLESS OTHERWISE SHOWN ON PLANS. THE METAL RAIL AND TOPS OF CONCRETE POSTS USED WITH THE ALUMINUM RAIL SHALL BE BUILT PARALLEL TO THE GRADE OF THE CURB.

METAL HANDRAILS SHALL BE IN ACCORDANCE WITH THE PLANS. RAILS SHALL BE AS MANUFACTURED FOR BRIDGE RAILING. CASTINGS SHALL BE OF A UNIFORM APPEARANCE. FINS AND OTHER DEFORMATIONS RESULTING FROM CASTING OR OTHERWISE SHALL BE REMOVED IN A MANNER SO THAT A UNIFORM COLORING OF THE COMPLETED CASTING SHALL BE OBTAINED. CASTINGS WITH DISCOLORATIONS OR OF NON-UNIFORM COLORING WILL NOT BE ACCEPTED. CERTIFIED MILL REPORTS ARE REQUIRED FOR METAL RAILS AND POSTS.

SPECIAL NOTES:

GENERALLY, IN CASE OF DISCREPANCY, THIS STANDARD SHEET OF NOTES SHALL GOVERN OVER THE SPECIFICATIONS, BUT THE REMAINDER OF THE PLANS SHALL GOVERN OVER NOTES HEREON, AND SPECIAL PROVISIONS SHALL GOVERN OVER ALL. SEE SPECIFICATIONS ARTICLE 105-4.

ENGLISH

JANUARY, 1990

STD. NO. SN

REV. 6-16-95 EEM (/) RGW REV. 5-7-03 RWW (/) JTE REV. 10-1-11 MAA (/) GM
REV. 8-16-99 RWW (/) LES REV. 5-1-06 TLA (/) GM REV. 12-17 MAA (/) THC

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